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CONTENTS

For complete table of contents see advertising page V

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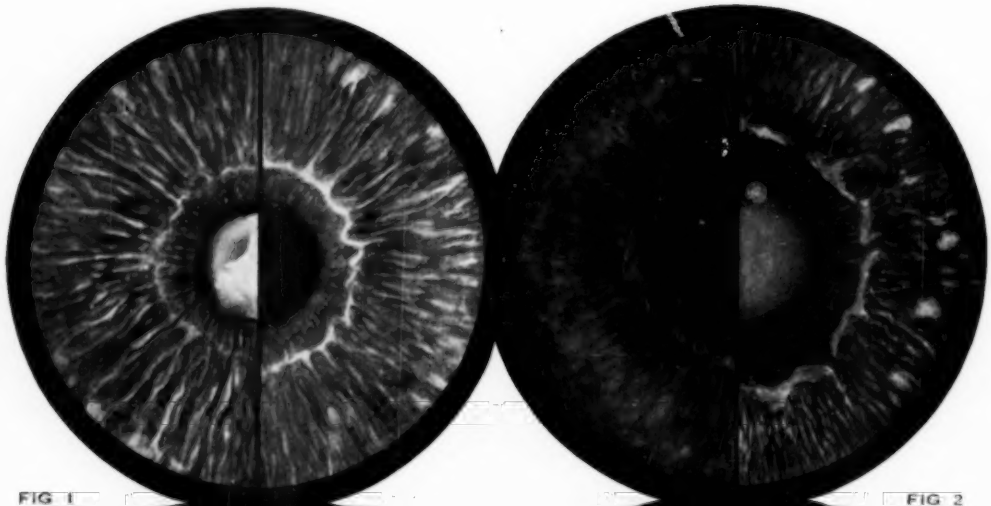

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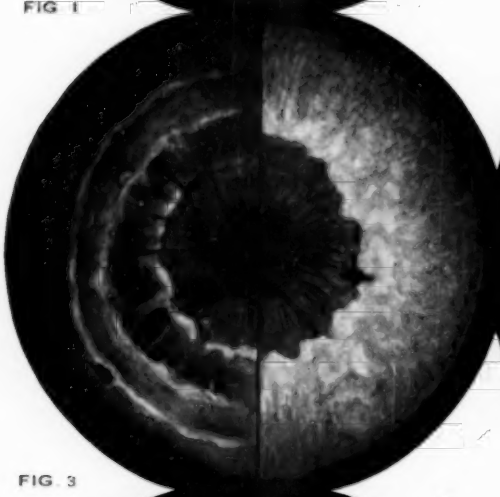

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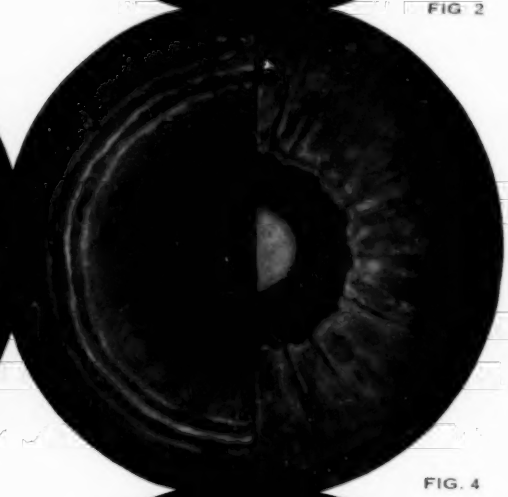

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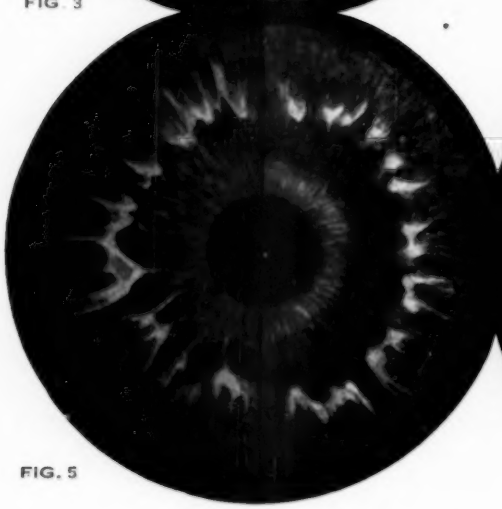

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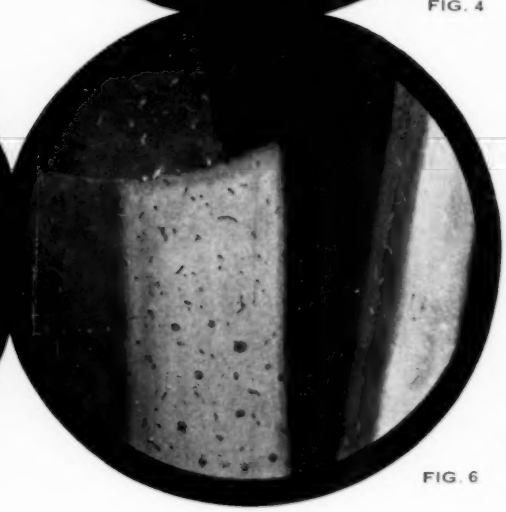

FIG. 6

HETEROCHROMIA (RALPH I. LLOYD). FIG. 1, IRIS ATROPHY AFTER TUBERCULOUS IRIDOCYCLITIS: SECONDARY CATARACT. FIG. 2, TYPICAL HETEROCHROMIA. FIG. 3, TYPICAL HETEROCHROMIA, WITHOUT ASSIGNABLE ETIOLOGY. FIG. 4, TYPICAL HETEROCHROMIA. FIG. 5, HETEROCHROMIA WITH GLAUCOMA. FIG. 6, SLIT-LAMP APPEARANCE OF LEFT CORNEA IN CASE DEPICTED IN FIGURE 5.

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HETEROCHROMIA AND ALLIED CONDITIONS

With case reports

RALPH I. LLOYD, M.D., F.A.C.S.
BROOKLYN

The various influences which bring about changes in the color of the iris are discussed and contrasted for purposes of differential diagnosis. These changes were little understood, much less adequately differentiated, before the microscopical examination of stained sections became available. Biomicroscopy, with slit-lamp illumination, has revealed the essential demonstrable characteristics of each of the several conditions. The clinical history, physical and laboratory examinations, prolonged observation of the course of the disease, and the effects of treatment all contribute to a comprehension of the significance of etiological factors. The importance of tuberculous infection is emphasized.

Heterochromia consists of a difference in color of the two irises; it is congenital or it is a result of uveal disease. The second type is considered here.

Jonathan Hutchinson was the first to notice that if a cataract appeared in the eye with the lighter iris, he got poorer operative results than with the usual case. Sym reported ten cases and observed the coexistence of optic neuritis, choroidal disease and glaucoma. Reinhard and Bistis operated for cataract in these cases with good results. Weill, apparently, was the first to specifically mention vitreous exudates and corneal deposits which indicated the presence of uveitis. Six of his seven cases had these features.

Fuchs, in 1906, reported thirty-eight cases, aged thirteen to sixty-four years, and included the microscopic examination of five iris sections. The posterior pigment layer of the iris was not affected; the pigment of the anterior stroma was found as granules scattered through the iris tissue, but not in the iris cells as in normal individuals. There was a diffuse infiltration of the uvea with lymphocytes, plasma cells and mast cells. He also found epithelioid cells but was not certain that they were constant features. The corneal deposits were from the uvea, and the ciliary epithelium was heaped in layers as in other long continued cases of cyclitis.

There was no plastic exudate, which explained the absence of synechiae and pupillary membranes or deposits, but the changes were so widely spread throughout the uvea that the coexisting good vision was surprising. Fuchs concluded that the characteristics of heterochromia are a change of iris color without adhesions, precipitates on the posterior surface of the cornea, preservation of vision except that cataract develops in most but not in all cases and the many years duration. In older patients the physiologic hardening of the lens nucleus did not take place; this led him to think that a prenatal influence was at work, that is to say one which was active during the first few years of life.

Because of the mild change in iris color and other trophic changes, which went along with ptosis, retrocession of the eye, small pupil and increased sweating of the face on the affected side, the influence of the cervical sympathetic as a causal factor was at first overemphasized. Lutz reported that nineteen of thirty heterochromia cases had the sympathetic involved; but his group of cases lived in a Swiss goiter district.

Angelucci removed the superior cervical ganglion from young dogs, cats, rabbits and monkeys, and later found alopecia, retarded growth of bone, teeth, cornea and sclera, nar-

rowed choroidal vessels and atrophic spots in the uvea.

According to both Weill and Fuchs, the name heterochromia eliminates all influences like severe chronic iridocyclitis, the loss of iris color in small areas or vitiligo flecks and siderosis. Essential atrophy of the iris and the regular atrophy of the iris after acute glaucoma may properly be considered in the differential diagnosis.

Genuine cases of heterochromia are not numerous and they vary in frequency in different parts of the world. Butler reports 0.03 percent among 6,000 eye patients in England, Lutz 0.2 percent in Switzerland and Berg 0.19 percent among 13,000 patients. The ages of the various groups reported are from 13 to 64 years, and the percentage of males is about 10 percent higher than that of females.

It is commonly held that the lighter colored eye is always the one affected, but Lauber, Salzmann and Herrenschwand agree that if the patient is a blonde, the darker eye may be the one affected. Among the illustrations shown in connection with this article, the half of the individual picture representing the diseased eye is as dark or darker than the normal half in two instances. If the deeper iris layers happen to be more heavily pigmented, the effect is darker than is the case in the light blue eye where the color depends on the retinal pigment on the posterior surface; darker eyes have mesodermal pigment in the stroma and upon the anterior surface of the iris.

Cataract, in these cases, is the result of a long continued uveitis, but occasionally milder grades of glaucoma have been found in heterochromia; serous iritis often carries this menace. The slit-lamp is an instrument of great value; many cases reported without corneal deposits will now be found with them.

The importance of nodules on the pupillary border of the iris, as indicating tuberculous disease, cannot be overestimated. Some observers have for several years followed typical tuberculous eye disease from the day when vision was first blurred by vitreous exudates. In some instances, the fundus was obscured by these exudates, while chorioretinal lesions have been observed in others. Iris nodules have been seen at some time during the period of observation, corneal deposits have been watched for many years, the early clouding of the lens at the posterior pole beneath the capsule has been found as a regular feature, after which the cataract develops to maturity, but the iris changes do not appear until late in the disease.

The pigmented border of the iris often disappears in senile eyes without disease; in tuberculous disease and in iridocyclitis it usually bleaches within a year or two, but iris depigmentation may go no further. It seems reasonable to say that the typical case is characterized by cyclitis, cataract and heterochromia, but lacks adhesions or other gross evidence of damage. It is to be looked upon as tuberculous disease; although other conditions may be found occasionally, tuberculosis must be excluded in the diagnosis. Krusius injected old tuberculin experimentally into the vitreous and also into the aqueous, with marked depigmentation as a result.

With the slit-lamp to guide us, many types of low grade uveitis that were formerly discharged as quiet will now be kept under observation because of the deposit of fresh bits and clumps of fibrin on the posterior surface of the cornea.

I have had one such case under observation for six years. Although the vision is excellent and the external appearance of the eye faultless, every examination made with the slit-lamp showed fresh clumps and bits of fibrin. There have been no adhesions, and no redness or pain since the original attack. The fundus showed two or three pigmented foci, but there have been no additions. At the posterior pole of the lens, beneath the capsule, is a small zone of "mashed potatoes" which shows the effects of the uveitis on the lens.

This is the type of case that has gone

on previously to cataract formation before receiving attention and which has usually developed heterochromia two or three years after the cataract had matured.

The nodules on the pupillary margin of the iris occupy an important diagnostic position. They have been produced by injection of various bacilli into the eye. They are an evidence of the iritis of syphilis, leprosy or sympathetic disease. When found during the course of a quiet or active iritis, tuberculosis must be considered.

In most cases of heterochromia it will not be difficult to demonstrate physical signs of tuberculous disease. In the group of cases of typical heterochromia upon which this article is based, there is but one in which no cause of any kind was found. All of the others showed definite tuberculous disease, either arrested or mildly progressive.

Omitting from consideration all cases with a history of traumatism to the eye or the neck, all cases of herpes, glaucoma, intraocular tumor and long standing iridocyclitis, which includes cases where the iris changes are secondary to an iris atrophy, it seems that we are justified in classing heterochromia as a chronic uveitis, usually of tuberculous origin.

Somewhat similar are essential atrophy of the iris, melanoma, vitiligo spots and true vitiligo. A small number of cases have all of the typical signs of heterochromia except cataract. The history of several cases will be given to bring out the clinical features. No pathological examination is included because no eye has been removed, but a résumé of the findings in the literature is substituted.

Figure one (see frontispiece) illustrates heterochromia following long-standing tuberculous iridocyclitis. Mrs. S. aged forty-three years came complaining of pain in the right eye, which had a visual acuity of 10/200. The other eye was normal. Both Wassermann and von Pirquet tests were negative. For the last ten or twelve years she had had asthma and bronchitis. There were many bronchial râles and her chest was distended as in typical emphysema. She wheezed and had a typical cough; she was under weight and had to live carefully.

This eye had been under treatment for a year and eight months. There were a number of spots and dots in the pupillary area of the lens, and an early opacity was found at the posterior pole beneath the capsule. The tension was normal and has remained so for more than nine years. The eye quieted in three months and remained so for four years; it was quiet again for two years; since then no further attacks have occurred.

Eight years and eleven months after her first visit, and after an absence of three years and four months, she appeared with a quiet right eye that had light perception, but the iris was much changed when compared with the other. This change took place during the last quiet interval. There are no fibrin deposits on the posterior corneal surface, and this justifies the belief that the eye is now really quiet. There are a number of new vessels running from the iris over to the anterior surface of the lens, with firm adhesions as a bridge. The lens is very thick and the tension of this eye is below that of the other.

The adhesions do not belong to typical heterochromia, but this can be shown as a case of heterochromia or of iris atrophy following severe iridocyclitis. It will be placed in contrast with a tuberculous patient who had typical heterochromia but no adhesions. This first case is one of fibroid phthisis.

Figure two (see frontispiece) is of a young woman with a history of arrested pulmonary tuberculosis. At the age of thirty-two years she came with the statement that the vision of the left eye had been poor for fifteen years. The vision now is 2/200 and both Wassermann and von Pirquet are negative.

The slit-lamp shows fibrin bits all over the posterior corneal surface and subcapsular lenticular vacuoles but no adhesions. The left iris is quite different in color from the right; this has developed since the vision failed. Dur-

ing three years' time the lens has become much thicker but the fibrin deposits are now practically absent. This case is one of typical heterochromia.

Figure three (see frontispiece) is of an apparently healthy policeman aged twenty-eight years. The teeth, nose, tonsils, urine, Wassermann, x-ray of chest and general physical examination are all negative. The vision of the right and left eyes, respectively, is 20/20 and 20/25. Both fundi are negative; the left iris is quite different in color from the right. The slit-lamp reveals clumps of fibrin on the posterior surface of the cornea. The iris change was noted eighteen months ago. This is the only case reported here in which no cause for the iris change could be found.

Figure four (see frontispiece) shows the irises of Mrs. D., aged 31 years, at her first visit. Twelve days prior to this she noticed blurring of the vision of the left eye. The vision of the two eyes was right 20/20, and left 10/200. She was apparently healthy but old lung signs were found both by x-ray and physical examination. The Wassermann was negative but the von Pirquet was strongly positive.

A few postcorneal deposits were found in the right eye and many in the left; a few typical iris nodules were seen but they soon disappeared and were replaced by others. Vitreous opacities and posterior polar subcapsular lens clouding were found. The patient was given tuberculin; and in three months the deposits began to clear up and the nodules ceased to reform, but the lens became more and more opaque, until after six months there was no vision except light perception. Not for two years did the iris change color.

New deposits on the postcorneal surface were always present but are now very scanty. Iris nodules were present for a second period about two years after the first observation. There are no iris adhesions. The cataract is well developed, there are many vacuoles beneath the anterior capsule and vision is very poor. The difference between this case and the first is that the nodules did not form adhesions in this one but did in the other.

It is reasonable to consider heterochromia as only a symptom, just as atrophy of the optic nerve is a symptom. Some cases have this symptom but also others that are more prominent; the heterochromia is secondary in importance. Of this type are case number one and all cases with an outstanding iridocyclitis.

A strong characteristic of heterochromia is the long time needed for the color change to develop. In many of the secondary forms, to be described later, effects of the disease do not cease when we think. In some cases despite a normally appearing eye, the disease is shown to be active because the postcorneal deposits are continually being replaced, not for a month or two but possibly for several years.

The only difference between the so-called primary or essential heterochromias and the so-called secondary cases is the reaction in the one type and the quiet continuance in the other. Case number three differs from the usual one because it has no cataract and no iris nodules have ever been seen.

It is reasonable to class the primary heterochromias by themselves and to assume that they are frequently the result of quiet uveitis of tuberculous origin; those cases in which no cause can be found should be considered tuberculous until proven otherwise. Iris nodules give a strong hint of the nature of the basic disease.

A perusal of the bibliography of this subject is recommended. The early clinical observations by clinicians of a period without laboratory facilities will impress anyone. Fuchs and the Vienna group give a detailed clinical study with microscopic examinations.

Iris atrophy is distinct from heterochromia and is associated with glaucoma, long standing iridocyclitis, trauma of the eye or of the sympathetic nerve, herpes, and so on. Fuchs called attention to corneal deposits, but the slit-lamp made possible an interpretation of this important feature.

The profession has been slow to appreciate that tuberculosis of the eye is relatively common and that one phase of it is a long standing uveitis running over a period of years with no change in the eyeball evident to unaided inspection. During this time, there may be subacute attacks resembling disseminated choroiditis or a chorioretinal conglomerate mass. Observation of the fundus may be prevented by lens clouding or vitreous exudate.

All of these cases are characterized by deposits of fibrin on the posterior surface of the cornea, which are constantly being absorbed while new ones are forming, and by nodules of the Koeppe type on the edge of the pupil. Sooner or later the lens is affected and shows first, at the posterior pole, a diffuse clouding which eventually goes on to a complete cataract.

After some years the iris loses color, and if there have been no iris adhesions this is a typical heterochromia. If adhesions are formed when the iris nodules develop, the case is then one of iris atrophy, the result of a long continued iridocyclitis, and not a genuine case of heterochromia.

I have had under observation a case of this type for a period of six years; during this time fibrin deposits have been found whenever they were looked for. Only once have iris nodules been found.

This patient lost the vision of the right eye early in life because of a large pigmented patch at the macula, and she came first because of blurred vision in the left eye caused by vitreous exudates. The corneal deposits were aggravated by tuberculin at one time. The acute signs in the left eye soon quieted without adhesions, but the right eye developed them. The color of both irises has faded in the past two years. An internist found many signs of old tuberculosis in the lungs.

The difference between this case and other typical cases presented is that the whole process has been observed through pupils that have remained clear enough for examinations of the fundus.

While most heterochromia patients have developed cataract, not many have developed glaucoma. Number five is an example of the latter. A man, aged fifty-two years, a machinist, noticed that reading with his glasses was becoming more and more difficult and went for an eye examination. He complained of rainbows about lights at night, and blurred vision of the left eye. His right hip and knee had troubled him since childhood, when he had several chronic discharging abscesses in the region of the hip. He was confined to bed for six months, at the age of six years, while the hip was being treated. This disease was probably tuberculous.

The unaided vision was 20/100 and 20/200. There were a number of scars on the right cornea and fewer on the left, due to ulcers at the age of six or seven years. The tension was 28 to 30 and 60 to 65 mm. with the McLean tonometer. The left iris was colored differently from the right (see figure 5, frontispiece); this was noticed ten or twelve years ago. The lens was fairly clear, but there were some signs of lens thickening. A multitude of fine fibrin bits were found on the posterior surface of the cornea. (See figure 6, frontispiece.) There were no signs of adhesions or deposits in the pupillary area of the lens.

The tension, under miotics, dropped for a time, but soon reached the original status and a trephining was done. This was successful but was complicated by a slowly absorbing hyphema. The view of the disc was much obscured, but it was believed to be cupped.

Atypical heterochromias are most often the result of long continued iridocyclitis and are usually called atrophy of the iris. A long continued cyclitis of any kind will sooner or later lead to a change in iris color, and to an abnormal prominence of the radiating white lines of the iris. It is especially common among syphilitic patients. Soewarno found that 9.5 percent of his 336 patients with specific iritis had this change in iris color. The first change to occur is the blanching of the pigment at the iris margin, but this also occurs

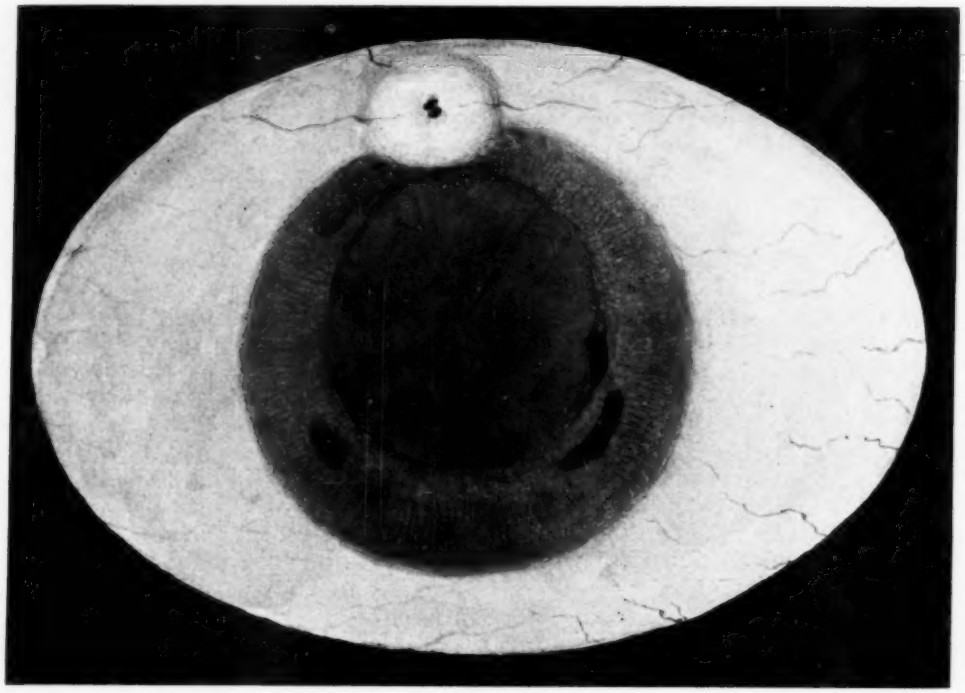

Fig. 7 (Lloyd). Iris atrophy after acute glaucoma. Right eye.

in normal older people, and especially in those with light colored irises.

Syphilologists recognize three types of iris atrophy; the most common follows long continued iridic inflammation; a second type is a part of the Argyll Robertson symptom complex; and the third is an atrophy without antecedent inflammatory signs such as is found in any severe specific diseases of the nervous system like tabes. The first type is a true secondary iris atrophy which carries with it all the signs of inflammation. The second and third types belong in the group of essential atrophies.

Most cases of tuberculous uveitis with involvement of the iris belong in the secondary iris atrophy group, because there are many adhesions formed while the pupil is occluded and secluded. The color of the iris fades and the entire iris is atrophied. More or less cataractous change occurs. It is our belief that typical heterochromia is a tuberculous uveitis, although there are some exceptions. Most tuberculous uveal disease does not remain in this typical class because the inflammatory signs are so prominent and frequent.

A most pronounced change in the structure and color of the iris often occurs in acute glaucoma (see figure 7), or in chronic cases with high tension over an extended period. The complications of fistulizing operations for glaucoma are pigmented deposits on the posterior corneal surface, formation of adhesions, and partial opacity of the lens with an increase of near-sightedness.

Apertures in the posterior pigment layer of the iris often develop. If the fundus is illuminated through the pupil the aperture is seen in the dark room as a red reflex. (See figure 8.) This is evidently the combined effect of pressure and some other element such as quiet iritis. Central vision may be fairly good. The clinical picture is not in the same category with heterochromia.

Another secondary form of change in iris color is that found in siderosis;

it is a type liable to be misinterpreted.

A temporary change in color of the iris is seen in cases of subchoroidal hemorrhage, and here the result is a greenish effect. Another change in color of the iris may be seen in certain cases of intraocular tumor. A recent case of glioma of the retina, in a child of seventeen months, showed a normal light blue iris and a darker, dull blue iris that had lost the usual surface details.

A very different condition in which the iris contrast is also the striking feature is melanoma, but the darker eye, if the case is unilateral, is the affected one. There is no cataract or uveitis but there is a decided tendency to sarcomatous degeneration. The diagnostic features of essential atrophy, vitiligo and vitiligo spots, and melanoma, with the literature of each will be presented separately.

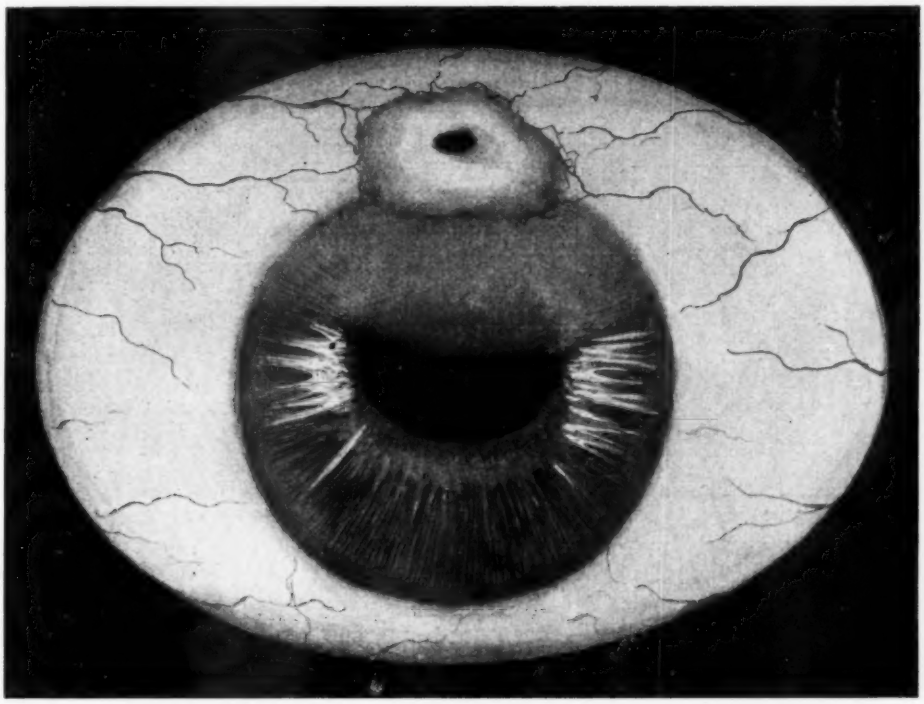

Fig. 8 (Lloyd). Iris atrophy after acute glaucoma. Left eye.

Essential atrophy of the iris

Essential atrophy of the iris is a very rare condition characterized by development of an eccentric and distorted pupil, atrophy of the stretched half of the iris, and finally glaucoma.

The pupil ring retains more of its original form than any other part of the iris, but may be displaced far to one side where it is attached to the ciliary angle by shrivelled remains. On the opposite side, the iris atrophies until only a few strands remain, with apertures between. The loss of normal iris tissue and the deposit of cell detritus in the filtration angle are contributory to the glaucoma, but adhesion of the iris root to the cornea is a more important factor.

No cause for the atrophy has been assigned except in Lecsko's case, which was attributed to syphilis. De la Vega asserts that this disease can cause an atrophy of the iris without inflammation.

Not more than twenty cases have been reported. This peculiar atrophy is similar to the progressive atrophy of certain cases of persistent pupillary membrane that have been observed

from birth, and are associated with other defects such as coloboma of the choroid, dislocation of the lens and high myopia.

Congenital polycoria should not complicate the diagnosis because it is present at birth and remains in the original state.

Melanosis

This is a congenital anomaly characterized by surplus of pigment in those with dark hair, eyelashes and eyebrows and much pigment in the skin. If unilateral, the affected iris is dark brown or black while the normal iris is lighter in color.

There may be wartlike masses on the anterior iris surface, and pigment may be found also in the sclera near the limbus, in the conjunctiva, and on the optic disc; the fundus may be so heavily pigmented that none of the usual characteristics of the choroid are visible. The fundus color is slate gray or metallic, and often approaches the negroid type.

The pigment on the sclera is conspicuous because of its background; it shows no tendency to group about the vessels and is gray, blue-gray or brown. The eyelids may also partake of the pigmentation, which, in this case, is either brown or black. There is also a tendency to the formation of pigmented nevi.

The refracting media are not changed and the vision is unaffected. There is no uveitis as in heterochromia. Cataract is not a feature. There is a decided tendency toward the development of melanosarcoma in or upon the eye, as the occurrence of seven cases in a group of twenty-six would indicate.

When an affected child is born, the features described are present to a greater or less degree, and they may increase decidedly during early life. The affected eye of heterochromia is almost always the lighter colored, while in melanosis the affected eye is always the darker of the two. Bilateral cases have been reported, but the larger number have been unilateral.

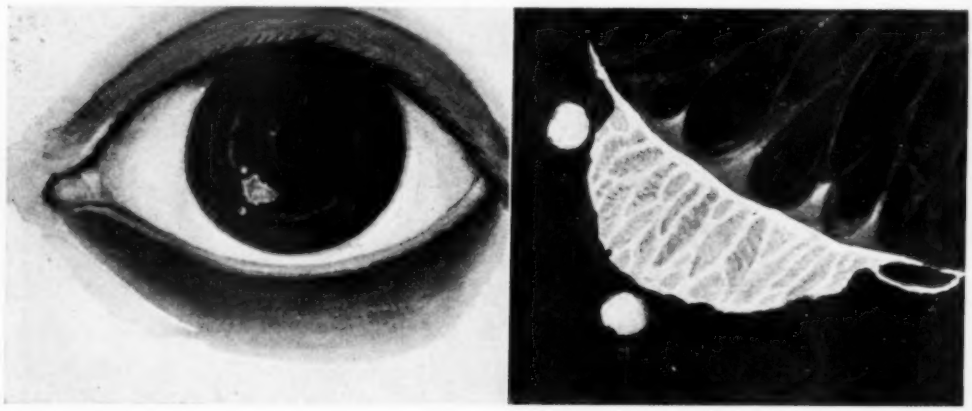

Fig. 9 (Lloyd). Congenital pigment defect.

Vitiligo, vitiligo flecks, and the iris

Figure 9 shows an apparently congenital pigment defect of one iris in a ten-year-old child. It has been under observation for two years and has not changed in any way during that period. The slit-lamp shows nothing abnormal in the way of pigment deposits or fibrin on the posterior corneal surface.

The white spot is apparently on a lower level than the surrounding iris tissue; it has a smooth white floor. The normal lattice work structure of the iris seen elsewhere is absent at this spot. It suggests the vitiligo flecks described by Fuchs and others in those who have had smallpox.

This type of change of iris color is from a permanent loss of pigment in

the affected area, of which there are usually a number scattered over the iris. Krückmann, under the title of specific leucoplasia, mentions something of the same nature during the secondary stage of syphilis; but such spots usually are eventually covered by a darker pigment and escape notice thereafter.

Another very rare condition with blue-gray or gray-white spots on the iris in the early stages, and which may later increase in size and number, is the genuine vitiligo which is sometimes associated with profound trophic changes in the fundus and iris, as well as in the skin and hair of the head. This achromia of the iris may be associated with pupillary membranes caused by a low grade uveitis suggestive of heterochromia. Chorioretinal tissue does not escape in severe cases, as the early development of night-blindness shows.

The cause of this change is unknown. The child whose iris is pictured has never had smallpox or any other serious illness. After the slit-lamp examination it was classed among the congenital defects of the anterior iris layers.

14 Eighth avenue.

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A CASE OF HETEROCHROMIA IRIDIS

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Chronic uveitis was apparently the result of acute mastoiditis, and the heterochromia of the iris developed as a further complication. The left eye became involved four years after the right eye, following a new attack of mastoiditis.

The color of the iris is due to the proportion of pigment in the branched cells of the stroma and to the retinal pigment layer on the posterior surface. The stroma pigment is scarce at birth, but it increases afterward or remains scarce throughout life. This fact explains why the irides appear of lighter color at birth than later. If the stroma pigment does not increase or remains permanently deficient the color will be blue or gray, but if it does increase the irides will become brown or more or less dark. In general we can state that the color of the eyes corresponds to that of the skin.

The distribution of the pigment may be uniform or irregular. Thus we may have one section of an iris brown and the rest blue or gray; or dots, which resemble grains of black powder, may be visible on the anterior surface. The iris of one eye, without pathologic significance, may differ in color from the other. This differentiation appears immediately after birth and is therefore congenital.

The acquired form of depigmentation of the iris is according to Galezowski due to chronic uveitis. This uveitis produces fine precipitates on the posterior surface of the cornea, and opacities of the lens. Butler called the affection heterochromic cyclitis and associated the alteration of the iris with a chronic cyclitis. Fuchs (1902) reported several cases and thought that the disease was the consequence of chronic cyclitis

which may be present for many years without alteration of the cornea or the lens, or depigmentation of the iris. Mayou (1910) observed that with decoloration of the iris one sometimes saw paralysis of the cervical sympathetic nerve supply, accompanied by ptosis, enophthalmos, myosis, and unilateral atrophy of the face. Bistis (1912) reported cases in which he saw evident signs of paralysis of the sympathetic nerve. He experimented on rabbits by sectioning the superior cervical ganglion and produced in these animals, after the lapse of some time, all the manifestations which are observed in men. These manifestations include (1) the syndrome of Brown-Séquard and Horner (ptosis, myosis, facial hemiatrophy) and (2) discoloration of the iris on the same side of the paralysis. Microscopic examination of pieces of iris revealed the disappearance of pigment from the stroma, alterations of the walls of the blood vessels and the appearance of fibrillæ of connective tissue.

This alteration of the irides is generally known under the name of heterochromia, although other names have been suggested. Scalinci proposes "anisochromia iridis" as more appropriate. According to him the term heterochromia ought to be given exclusively to the different coloration which is observed in the iris of the same eye. This author is inclined to think that the alteration of the cervical sympathetic nerve supply is a more important factor than cyclitis in the production of the disease. Scalinci believes that the affection of the cervical sympathetic nerve produces a vasomotor disturbance of the uveal tract, which becomes less resistant and consequently more apt to be affected by some unknown agent in the blood.

Case report

The case which I report is interesting because the depigmentation appeared first in the right eye, then four years later it occurred in the left one, following an inflammation of the mastoid process. The depigmentation of the left iris was accompanied by symptoms of chronic uveitis without the least alteration of the cornea and lens.

G. G., 29 years of age, well developed, apparently enjoying good health, had had a discharge from the left ear for a few years in childhood. In 1919, while in Genoa, Italy, after having taken a sea bath one day he had wakened early the following morning with dizziness and with intense pain in the left ear, for which he was sent to a local hospital where a mastoid operation was performed. According to the patient, three or four days after the operation a black spot had appeared in front of the right eye, moving around as he moved his eyes. He had remained in the hospital only nine days; he had then been treated in the out-patient department for three consecutive months, and then had started for the United States of America.

After his arrival in this country the moving black spots in front of the right eye had gradually increased and had become of great annoyance to him. In April, 1921, the right eye had become red and somewhat painful, and then for the first time the patient discovered that the color of the iris had changed.

At the time of my first examination in June, 1921, the iris of the right eye was gray on the temporal side with some scattered brown spots on the remainder, specially noticeable near the pupillary edge on its lower inner part. The iris of the left eye was uniformly brown. The anterior chamber of each eye was normal and the pupillary reaction to light and accommodation was also normal. The ophthalmoscopic examination revealed no alteration of the fundus, but showed dustlike opacities in the vitreous of the right eye. The Wassermann test was negative. The patient was examined every two or three months and at each examination the depigmentation of the right iris has been observed to be steadily increasing until at the present date the color has become uniformly gray with hardly a spot of brown to be observed anywhere.

In January, 1923, the left ear began to trouble him again and another opera-

tion was performed on the mastoid at the Rhode Island Hospital. In February of the same year discoloration of the iris of the left eye began to appear in the periphery and on the temporal side. The depigmentation has steadily increased ever since. Now only a very narrow zone of faint brown tint is seen around the pupillary margin; the rest is gray. The pupils of both eyes are equal and the palpebral fissures are normal in width. There is not the slightest ptosis or facial atrophy. With low plus spheres and cylinders the vision is 20/20 in each eye.

The patient still complains of spots in front of his eyes, but they are not black any more and he seems not the least annoyed by them. The ophthalmoscope does not reveal any opacities in the vitreous. This case was presented eight years ago at a meeting of the Rhode Island Ophthalmological and Otological Society when the right eye only was affected and floating opacities in vitreous were very evident. My last examination was on the sixteenth of June, 1928. The right iris had become entirely gray. The left one was also entirely gray except for a very narrow, faintly brown zone around the pupillary margin. Which of the two theories, inflammation of the uveal tract or paralysis of the cervical sympathetic nerve, can be applied to our case to explain the development of the depigmentation in one eye and then in the other? The palpebral fissure of each eye has always been of normal and equal width; no ptosis of the lids has ever been observed; the pupils have been of normal size, reacting normally to light and accommodation; not the slightest atrophy of the face has appeared. We can exclude, I think, any alteration of the cervical sympathetic nerve supply in this case. No precipitates on Descemet's membrane or opacity of the lenses have ever been observed in either eye during the long development of the affection. The dustlike opacities of the vitreous which were visible seven or eight years ago had nearly all disappeared at this last examination. Although Fuchs says that cyclitis may last many years without producing any alteration of the cornea and lens I exclude this pathologic condition also, in view of the manner in which the depigmentation manifested itself. It was during an acute mastoiditis of the left side and after an operation to relieve this condition that the right eye became affected as we have already said, and it was during another attack of mastoiditis four years later that the left iris began to change color. In view of the history I think that the pus in the mastoid cells was the cause of the peculiar chronic uveitis; it constituted a real focal infection.

Berg, in 1925, reported a bilateral case which he had under observation for seven years.

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OPHTHALMIC EDUCATION

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IOWA CITY

Undergraduate and graduate teaching of ophthalmology is described in detail as organized in the thoroughly modern establishment of the University of Iowa. For undergraduates, an attempt should be made to teach mainly the ocular complications of general diseases and a few common ophthalmological conditions, while for graduates the period of training should be of two or more years duration, and should consist of a thorough education in both the basic and the clinical aspects of ophthalmology. From the department of ophthalmology of the college of medicine, State University of Iowa.

The teaching of ophthalmology to undergraduate and graduate students is of importance not only to those of us directly interested in teaching but also to those in private ophthalmic practice. With ophthalmologists who are teaching undergraduates lies the responsibility for creating young physicians who can and will intelligently use an ophthalmoscope as an aid to the diagnosis of general diseases, for turning out graduates who are sufficiently well informed to diagnose and treat common external ocular ailments, for training the coming generation of general practitioners so they may make intelligent diagnoses and refer patients advisedly, for stimulating certain students to take up the subject as a specialty, and for creating a respect for ophthalmology in teachers and practitioners of internal medicine, neurology, pediatrics, and allied subjects.

With the teachers of ophthalmology who are interested in the training of specialists lies the responsibility for training specialists who will be able to take care of the public in a proper manner, for providing well-trained men to act as assistants and become associates in busy offices and clinics, for furnishing men to take the places of the leaders in our specialty, for stimulating interest in research in order that progress may be realized, and for training graduate students well and in such a manner that ophthalmology will continue to advance and maintain its standing in the vanguard of the specialties.

Undergraduate ophthalmic teaching is of interest to the oculists in private practice, since general practitioners must be so trained that they have a fair knowledge of ocular diagnosis; the general practitioner must also have sufficient command of ophthalmology to be able to refer cases intelligently and at the proper time. All too frequently cases such as glaucoma or beginning optic atrophy are improperly diagnosed by the family doctor, and the patients are advised to wait until their "cataract" is ripe before consulting a specialist. Incidents like this hurt the medical profession in general, for many patients realize that they have not been properly advised. The ophthalmic specialist in private practice is also interested in graduate teaching, not only because he may derive some direct good from it, but because it provides young oculists who may act as assistants and perhaps later as associates in a growing practice.

The training of undergraduates

There is a diversity of opinion as to the relative importance of ophthalmology in the undergraduate curriculum. When the subject is considered and taught as a part of general medicine it assumes importance. The intelligent use of the ophthalmoscope as an aid to general diagnosis cannot be overemphasized. Quite frequently the oculist is the first to make a provisional diagnosis of renal disease, arteriosclerosis, diabetes, brain tumor, or other disease in which the essential pathology is situated in a distant organ.

The number of hours devoted to the teaching of ophthalmology varies in different medical schools; fifty to sixty hours is an approximate average. Certainly a sufficient number of hours should be allotted for teaching the average student something of the common external diseases of the eye and a great

deal of the ophthalmoscopic appearances of the fundus in general diseases.

It is advisable that the teaching of ophthalmology should begin in the first semester of the junior year. Or better still a few hours of ophthalmoscopy may be given as a part of the general course in physical diagnosis at the end of the sophomore year. Ophthalmic training in the University of Iowa is instituted at the beginning of the junior year with a series of sixteen didactic hours—two lectures each week over a period of eight weeks. This course is a lecture-quiz course covering the following thirteen subjects: cataract, glaucoma, optic nerve, retina, choroid, iris and ciliary body, pupils, cornea, conjunctiva, lacrimal apparatus, eyelids, injuries of the eye, and squint. A part of each hour is devoted to an illustrated lecture on one of the above subjects. At the beginning of the next lecture period a ten minute written quiz is conducted on the subject of the previous lecture. Following this quiz a discussion of the quiz conducted in the previous period is held. The hour is then completed with a lecture on another subject.

A textbook* has been evolved from these lectures which the student is advised to study following each lecture. The text contains many outline drawings and the student is expected to bring the book to class in order that these drawings may be filled in as the lecturer illustrates his points with chalk drawings on the blackboard. By this method of teaching the student goes over each subject four times; i.e., during the lecture, during the reading of his text, during the quiz, and finally during the discussion of the corrected quiz papers. In this final discussion all mistaken ideas are corrected in the minds of the students. Ophthalmic diagnosis in its relation to general diseases is fully discussed in these lectures. The students also consider such pure ocular conditions as cataract, glaucoma, squint, and those enumerated in the above list.

* "Ophthalmology, notes for students"; by C. S. O'Brien, M.D.

Immediately following the general survey of ophthalmology which is offered in the junior lectures, the class is divided into four clinical sections. Each section attends the clinics in ophthalmology, three hours weekly, over a period of eight weeks. The clinical instruction is far more essential than the didactic course, because here the different pathologic conditions are visualized. During the period of clinical instruction the section is subdivided into small groups and an instructor is provided for each group. An endeavor is made to provide an instructor for each subgroup of three to five students. In this way the student works under direct personal supervision of a teacher, who answers his question and corrects his mistakes.

Clinical teaching is confined almost entirely to ophthalmoscopy. An electric ophthalmoscope is provided for each student and he is trained in its use. The recognition of lesions which result from general diseases and the aid which may be given by ophthalmoscopy to general diagnosis are impressed upon the student. He is expected to use an ophthalmoscope, much as he is expected to use a stethoscope, a percussion hammer, or other diagnostic instruments. In addition the student is taught to recognize and treat a few common ocular diseases such as cataract, glaucoma, squint, interstitial keratitis, corneal ulcers, and gonorrheal ophthalmia. Material for these clinics must of necessity come mainly from the medical and neurological wards. It is necessary to have correlation between all departments in a teaching hospital. During the clinic each instructor has an equal number of patients and students, thus each student is provided with material at all times. By rotating the students at intervals every patient is examined by each student. Every half hour during the clinic the subgroups rotate to a new teacher; in this manner each group rotates through the list of instructors.

In the actual clinical teaching the student is first taught the proper method of handling the ophthalmoscope

and the use of the lenses in the Rekos disc. Only the direct method of ophthalmoscopy is used. The student is then taught to recognize opacities in the eye media and methods of localizing them. Special emphasis is placed upon the diagnosis of cataract. Then an eye-ground is demonstrated with the Gullstrand ophthalmoscope and the disc, macula, vessels, and details of the general fundus are pointed out. After such a demonstration the student begins his actual ophthalmoscopy. After seeing several normal fundi and being taught to recognize common variations the student is introduced to the appearances of hemorrhages, exudates, degenerations, pigment changes, edema, and other objective signs of disease. Later the special diseases are taken up and cases are demonstrated. Colored lantern slides of fundus conditions and the projection of slides showing pathological conditions are also utilized to impress certain clinical and pathological findings upon the mind of the student.

Absolutely no refraction is taught since it is felt that this has no place in the needs of students who are preparing for general practice. During the entire undergraduate course only one period is allotted to surgical demonstrations. Each student sees one cataract extraction in order that he may see something of the technique of ocular operations and in order to impress upon him the fact that cataract is an opacification of a structure situated in and not on the eye.

Stress is placed on the use of the ophthalmoscope, because it is felt that undergraduates are preparing for a career in general medicine and that this training will be of greatest good to them in diagnosis. A few of the primary ocular conditions are equally impressed on the student's mind; e.g., cataract, glaucoma, iritis, conjunctivitis, and corneal ulcer, but no time is wasted on the differential diagnosis of types of corneal ulcer, conjunctivitis, and such. It is hoped that by showing the student the value of ophthalmoscopy he may be stimulated to continue ophthalmoscopic examinations during his general internship and subsequer practice.

The clinics in ophthalmology continue during the first semester of the senior year—three hours weekly for eight weeks. In the second semester of the senior year only certain groups of students continue in ophthalmology. In Iowa elective groups of studies are allowed during the second semester of the senior year. If the student elects eye, ear, nose, and throat instruction he receives thirty-two additional hours of ophthalmology. Even in this course emphasis continues to be placed on the use of the ophthalmoscope and its value in general diagnosis. If the student elects medicine or neurology he is instructed in ophthalmoscopy as one of the allied minor subjects.

Perhaps the emphasis which is placed upon ophthalmoscopic diagnosis may not meet with the approval of other teachers of ophthalmology. However, it is felt that in the training of students for general medical practice the eye should not be considered as a separate organ but as a part of the entire body, and when so considered fundus diagnosis assumes more importance.

It has recently been my privilege to observe the methods of several European teachers of note. While many hours of ophthalmic lectures are delivered and patients are demonstrated to large classes during these same lectures, comparatively few clinics are held for undergraduates. Apparently the emphasis is placed on pure ocular conditions and it seems that the relation of the eye to general diseases is sadly neglected. This, as may be surmised, is not in accordance with my impressions as to the greatest good which may be derived by the undergraduate from his course in ophthalmology. If the student desires to study ophthalmology as a specialty after his degree in medicine is granted, then is the time to make an exhaustive study of purely ocular diseases.

The training of graduates

It should be the aim of ophthalmic teachers to train specialists who are

competent to handle advisedly all phases of ophthalmology. The responsibility for such training rests with those of us who direct and teach in institutions where special training is provided.

No prospective graduate student should be allowed to enter a specialty without a proper general medical background, since no organ can be isolated from the body and considered apart. This applies especially to ophthalmology with its many ramifications into the realms of internal medicine, neurology, otolaryngology, and other branches of medicine. Certainly one who is entering the field of ophthalmology should have, as a minimum, a general internship in which emphasis has been placed on internal medicine and neurology. If a certain period of general practice is added to this it will improve the general viewpoint of the prospective oculist. In Iowa one year of rotating internship is required as a minimum for entrance into the department of ophthalmology.

The question now comes up as to the proper method of training physicians who are entering upon a career in ophthalmology. The long postgraduate course, of one or two years, in which the student attends lectures and demonstrations in basic and clinical subjects, is an excellent method. On the other hand, many excellent ophthalmologists have received all their training as internes in ophthalmic hospitals. There are objections to each of the above courses of training. The postgraduate school method is open to objection, because, while the groundwork in ophthalmology is usually beyond criticism and the training in the basic subjects is usually good, the student lacks contact with large numbers of patients and has not an opportunity to try out the methods which are taught him in the lecture room and at the demonstrations; he has not the opportunity to gain practical experience; and he is not properly trained in ocular surgery.

The ophthalmic hospital internship method is objectionable because of the lack of training in basic subjects, the poorly correlated clinical teaching, and the lack of supervision. Also in the ophthalmic hospitals there is often a tendency to think of the eye as an isolated organ and not enough stress is placed upon the relation of eye diseases to general medical and neurological diseases. If the student can and will take the time to do so, an ideal method is to pursue a course of postgraduate lectures and demonstrations for at least a year and to follow this with an internship in an ophthalmic hospital which is connected with a general hospital. In Iowa an effort has been made to take the best from the above methods and utilize them in training the ophthalmic specialist—i.e., to teach the basic subjects during the period of internship.

The period of training depends of course upon the clinical material, methods of teaching, and upon the ability and application of the student. On an average perhaps two to three years should be the minimum period of training, with an added year or two if possible. In the University of Iowa the period of ophthalmic training is never less than two years, and it is now being extended to three years for students who are apt and show a desire to go ahead in the subject.

During the period of ophthalmic training every student should have someone to guide his efforts. Counsel should be offered as to the proper methods of study, consultations over difficult and unusual cases should be held, and continued contact should be maintained between those individuals of advanced and elementary ophthalmic education. In the eye clinic at Iowa there is an unwritten rule that any house man may consult with the chief or assistant chief of service at any time. This sort of thing is encouraged and I must say that advantage is taken of the opportunity many times each day. In other words supervision is offered and accepted at all times; an advantage perhaps held only by institutions in which the director and his assistants are on a full time salary basis.

As stated in a former paragraph, a combination of postgraduate lectures and an internship in ophthalmology is probably the ideal method to pursue in the training of a specialist. Certainly the basic subjects should be taught, as well as the clinical aspects of the subject. In our own clinic the ophthalmic internes are instructed in the following subjects:

Basic subjects

(a) Anatomy of the eye and the nervous system: This course is given by Professor MacEwen of the department of anatomy. The student is taught the anatomy of the eyeball and orbit and the anatomy of the brain. Special emphasis is given to the visual pathways and to the nerves supplying the eye. Two hours a week over a period of one school year.

(b) Optics: This course is given by a member of the staff of the department of physics under the direction of Professor Stewart. The student is instructed in the action of mirrors, lenses, and prisms, and in other optical problems related to the eye. Two hour periods each week during one semester.

(c) Physiology of the visual apparatus: This course is given by Professor McClintock, head of the department of physiology. The physiology of the visual apparatus is discussed from the standpoint of the physiologist. Two hours weekly for eight weeks.

(d) Embryology of the eye: A series of lectures and demonstrations with lantern slides is given by a senior member of the department of ophthalmology. Not only pure embryology is discussed but also the mechanism of the production of developmental anomalies. Two hours each week for twelve weeks.

(e) Histopathology of the eye: This course is given by a senior member of the department of ophthalmology. As soon as an interne enters the ophthalmological service he is required to spend two hours daily over the microscope. During the first two or three months the student is provided with serial sections of a normal globe and is required to study these while reading through E. V. L. Brown's translation of Salzmann's "Anatomy and histology of the human eyeball". Each student goes through this book twice: the first time the book is read and the slides are studied as progress is made through the text; the second time it is read the student makes a written résumé of the text. After having fixed the normal anatomy of the globe in mind in the above manner, the student studies a series of one hundred and fifty sections, each section being from a different type of pathologic eyeball and each eye being accompanied by a detailed written description. The student is then in a position to take up the study of current material as it comes from the laboratory of ocular pathology. The instructor in ocular pathology is available for consultation on any point at all times and if the student does not recognize certain features of a slide he is immediately advised as to their meaning. The course in ocular pathology is given with the aid of the microprojector and is a combined lecture-demonstration course, two hours a week during the school year.

(f) Biochemistry: Lectures are given by Professor Matill, head of the department of biochemistry, on the normal chemistry of the body, and by Dr. R. B. Gibson of the department of medicine on the pathologic chemistry of diseases associated with ocular symptoms. Two hours a week for eight weeks.

Clinical subjects

The course of instruction in clinical subjects is continuous and really extends over the entire period of internship. The consultation method is used. At all hours of the day the members of the senior staff are available for consultation. If there is a question in the mind of an interne on any subject, or doubt as to diagnosis or treatment of a specific case, consultation is immediately held. This is one of the advantages to the student who trains under a full time senior staff.

In the clinical subjects formal lec-

tures are given only in refraction and muscle anomalies. Only the consultation method is used in teaching ophthalmoscopic diagnosis, external diseases, biomicroscopy with the slit-lamp, perimetry, etc. If an interesting or unusual condition is discovered in a patient all the house men are asked to examine the case.

Perhaps more mistakes in diagnosis are made through errors of omission than through those of commission; consequently, printed forms are provided which the interne is taught to use and fill in completely on each patient whom he examines. In proper sequence all the structures to be considered in a complete eye examination are listed. On the back of this printed form is a complete outline of the routine for refraction and muscle examination. After a period of two or three years' training in this manner of history taking and examination one would expect the physician to think properly and to consider all points in an examination.

The house physicians are taught the use of the special instruments used in ophthalmology. In this class fall the Gullstrand ophthalmoscope, the slit-lamp microscope, the ophthalmometer, the exophthalmometer, the transilluminator, the perimeter and tangent screen, the kratometer, etc. The house physicians are urged to use these instruments and familiarize themselves with their relative value in all cases.

The duties of house physicians should be varied from time to time since they must be trained in all branches pertaining to the specialty. Certain duties performed by house men in some hospitals are an entire waste of time in preparation for a career in ophthalmology; by this I mean such things as examinations of the urine and prolonged technical laboratory work. Surely we expect any physician to be able to interpret urinary findings and to know how to do the general run of tissue work in a laboratory, but why waste many hours day after day doing these purely technical duties when they are better done by a trained technician? Relief from this sort of work will spare a busy house man some time to consult his books, work over a microscope, or spend the time in some other manner which will ultimately benefit his patients so much more. I believe each house physician should carry through the laboratory work on two or three globes in order to know how it is done, but how much better for him to spend most of his allotted laboratory time over the microscope learning to recognize the pathology of ocular disease!

Surgical training is of great importance. An interne should not be allowed to do surgery until he is familiar with the histopathology of the eye and has had a period of training in the clinical aspects of ocular disease. Neither should he be allowed to operate until he has been in attendance on operations a sufficient period of time. In our service the house men are expected to see all operations during their entire period of residency. During the first year they do no surgery, neither do they act as surgical assistants. They are expected to observe the operations in order that they may absorb some ideas of technique, methods of handling emergencies, and also in order to familiarize themselves with all types of ocular surgery. During their entire service they also make daily house rounds with the chief of service in order to observe postoperative treatment, complications, and results. During the first year of service the house man is taught and is responsible for anesthesia. He learns the methods of instillation anesthesia, subconjunctival injections, nerve blocking, and akinesis.

In the second year the house men do one half of the surgery, and are assisted by the chief of service who directs, advises, and teaches them. In the remaining operations they act as assistant to the chief of service. In this way each house men sees and does many operations and should be entirely competent by the time he has completed the two or three year period of training.

If it is possible to do so it is well to give the older house men an opportunity to visit other clinics, both domestic and foreign, in order that they

may see the work in hospitals of established reputation and in order to broaden themselves by contacts with the staff in such places.

In Iowa the house men in ophthalmology may work toward a degree of Master of Medical Science. In addition to the major subject of clinical ophthalmology, the student must have ten semester hours of minor subjects, which are provided by those basic courses enumerated above which are given by other departments in the University. Research must be carried out and a thesis written. If at the end of two years the student has completed the required hours, has carried out the research satisfactorily, has written an acceptable thesis, and then passes his examination a degree of Master of Medical Science is granted.

During a recent trip abroad I was impressed by the fact that those who train in the European ophthalmological clinics are willing to spend several years in preparation. Until recently our specialists in America have not shown the desire to go through a prolonged period of training. I believe we are coming to it and are just finding out that it takes time and experience to maintain a high standard. Also in the European clinics the spirit for investigative work is more highly developed, but again I believe I can say that this is developing rapidly in our own country. Another less favorable impression of their system was the almost complete lack of contact of the younger men with the chief of clinic; it seems that if the younger men could have more contact with the chief each day it would be of great benefit to them and to European ophthalmology in general.

In a discussion of ophthalmic training one cannot neglect to consider the short postgraduate course. This is offered primarily for the busy men in private practice and has its place in ophthalmic education. Such short courses of ten days to two or three weeks allow the busy practitioner to get away from his daily routine, to get into new surroundings, and to pick up a few points in diagnosis and treatment here and there. They are stimulating to the men who attend them or at least they should be so. To make these courses worth while they must be intensive and practical. Discussion of research problems or fancy theories have no place in such a course. The accepted methods of diagnosis and treatment, if proven worthy, should be dwelt upon. Short graduate courses in ophthalmology such as those given in Denver, Rochester, and Iowa City are a step forward in the education of our busy practitioners.

Research

In every teaching institution where it is possible to do so the spirit of research should be stimulated. There are so many interesting problems in ophthalmology which offer opportunity to those interested in them that provision should be made for carrying on such lines of work. Even to the type of house man who is interested only in clinical ophthalmology many lines of investigation are open. After the first few months of training have been completed most of the men are capable of carrying on some line of original work, either in a pure scientific field or along clinical lines. Most of them need only the proper stimulation and a little assistance. We are making an effort to provide just this sort of thing in our own clinic.

Much of the purely scientific research may be carried out by a scientist in some other field in collaboration with the clinical ophthalmologist. Some of the problems in chemistry, bacteriology, physiology, and physics are probably best attacked by a combination of scientist and clinician. In our own clinic P. W. Salit has done some very excellent work on the chemistry of the eye fluids during the past four years. No member of the staff in the department of ophthalmology could have done this work, and Mr. Salit himself could not have done it without the same guidance from a clinician. An ideal arrangement for a department of ophthalmology would be one in which two divisions

could be maintained—a clinical division and a research division. These two divisions should interlace, so that the members of each division may consult and collaborate with each other; then if a problem arises which requires the cooperation of two or three highly specialized workers it can be attacked in a manner which no one individual is able to pursue alone. In three or four clinics in the United States such a plan is under way. Let us hope the realization of this plan may lead the way to the solution of some of our perplexing problems!

In conclusion I shall only reiterate that with undergraduates an attempt should be made to teach mainly the ocular complications of general diseases and a few of the common pathologic conditions of the eye; while in graduates the period of training should be of two or more years duration, and should consist of a thorough education in both the basic and clinical aspects of ophthalmology.

State University of Iowa.

THE CONTROL OF TRACHOMA

N. Bishop Harman, F.R.C.S.
LONDON

The principal condition favorable to the spread of trachoma is squalor, the product of bad social environment. The most effective basis for a successful campaign against trachoma lies in a well organized school service, with its facilities for inspection and also for inculcating the sense of personal responsibility for bodily health. It is here recommended that in trachoma-ridden countries zinc sulphate drops shall be issued for general use by the laity. If the children of one generation can be kept free from the disease trachoma will become extinct. Read as the opening address in a discussion in the section of ophthalmology of the British Medical Association, Winnipeg, August, 1930. Published by kind permission of the British Medical Journal. (Mr. N. Bishop Harmon is ophthalmologist to the education department of the London County Council, and senior ophthalmic surgeon to the West London Hospital.)

Trachoma is practically extinct in England. It is still prevalent in some parts of the British Empire. It is rampant in some eastern countries. Trachoma was at one time common in England. The conditions that have conduced to its virtual extinction are worth investigation. They may point the way to measures calculated to secure a similar result elsewhere.

The necessity for control of a disease depends upon the measure of the damage done by it. To obtain this measure there would be needed a census of the eye conditions of the population. This is manifestly impossible. But we can fairly compare figures drawn from the examination of sections of the population. These, although not national maps, may be fair average samples. Hospital figures cannot be considered such samples, for they are obtained from selected portions of the population. The most desirable figures are to be obtained from the schools, and from the examination of recruits for military service.

Van Millingen[1], in 1895, collected figures for eighteen countries. Clemow[2], in 1903, supplemented these figures. They showed the wide spread of the disease and the unequal incidence in the several countries. I have collected some later figures, and these show that whereas in some countries there is an effective control of trachoma, in others the problem is still of great magnitude. From these figures we may judge the vast amount of suffering and loss of economic efficiency caused by the disease in countries where it is rife.

Egypt still heads the list of afflicted countries. In the last report[3] of the Ministry of the Interior of Egypt there are some astounding figures of the prevalence of trachoma among school children. An ophthalmic survey was carried out among all the pupils of the primary schools in certain capital towns of the provinces in which there were ophthalmic hospitals. There were seventeen schools with 8,045 pupils; "ninety-one percent of all pupils were found to be infected with the various stages of trachoma, while twenty-three percent of the total were found attacked with the serious stages of trachoma".

The figures are so amazing that one might ask whether the diagnosis of trachoma in so great a proportion of the children could be justified, and whether perhaps some other follicular condition might not have accounted for many. But there are available the series of reports of this department when the work was under the direction of A. F. MacCallan which fully bear out the high incidence. Also, there is Lister's[4] record of the examination of the Egyptian members of the Labor Corps employed in France by the British authorities in the great war—"at a low estimate forty-five percent were either suffering from or had had trachoma."

China runs Egypt close. Some twenty-five percent of the population appears to be affected. In the dramatic story of Professor Harvey Howard's captivity by Chinese brigands[6] there is this passage:

"Famines, floods and disease are rampant in China, but it is common

knowledge that the most devastating of these three is disease. And of all the disease, the one that is the cause of the most misery and economic distress is probably trachoma. It is found all over China; it affects nearly every home, and all classes of society. From statistics I had gathered, I had come to the conclusion that fully one hundred millions of Chinese people have trachoma, and that probably five million new cases, mostly children, develop each year. I had estimated that not less than one million Chinese are blind in both eyes, and that three or four millions more are blind in one eye; further, that not far from twenty millions have had their vision so much impaired by inflammation and the formation of scar tissue, due to trachoma, that they are able to eke out only the barest kind of existence."

The situation in India is better. Members of the Indian Medical Service have told me that although there is much trachoma it is less severe than in other Eastern countries, and is less important as a cause of blindness. The reports of the Madras Government Ophthalmic Hospital[7] for the six years from 1923 to 1928 show that of an average of 21,000 new patients each year about four and five-tenths percent were suffering from trachoma.

There are two recent reports for European countries in the papers of the League of Nations. In Italy, Lutraria[8] reports that trachoma is met with in almost all parts, but it is most common in the islands of Sardinia and Sicily. The army figures of 1913 show that of 502,221 conscripts, 3,543, or seven-tenths percent, were rejected for chronic conjunctivitis believed to be trachoma. In some of the islands the proportion of rejections was four times as high.

In Holland, Josephus Jitta[9] reports that trachoma is found only in Amsterdam, mostly among the poorer Jews. A commission of inquiry sitting in 1914-17 reported the existence of 3,300 cases. Of 66,418 Christian children 2,396, or six-tenths percent, and of 7,062 Jewish children 625, or eight and eight-tenths percent, had trachoma. He is of opinion that trachoma is not endemic in the country, but that it was imported from Poland and Russia. He states that it is above all a family disease. Children are affected at an early age either by their parents or by older children.

In the British Isles, Ireland shows most trachoma. Story[10] reports that there was a decrease towards the end of the century, but that in later years it has increased.

"Most of the credit for this increase is to be given to the American doctors, who inspected all immigrants to the United States at the Irish ports, and remorselessly refused embarkation to any with even doubtful signs of trachoma. Consequently, large numbers of most undesirable aliens were left stranded in Ireland—whole families, perhaps, from far regions of Eastern Europe, and trachoma accordingly became more prevalent in this country."

In England the figures collected in 1922 by the Committee on Blindness[11] were informative, but to my mind the best picture of present conditions is given by the figures of the London school children. London is a vast area; it includes every variety of social condition and a considerable alien community. For the children in the elementary schools there is a regular medical inspection, and there can be no doubt that every case of trachoma is accounted for. The cases found in the years 1925 to 1929 numbered 26, 20, 15, 16, and 27, so that for five years on an average roll of 650,000 children there was an average of under twenty-one cases of trachoma a year, or 0.00032. When we recall the risks of importation of trachoma through the huge shipping area of the Thames I think you will agree that trachoma is practically extinct in London.

In the United States, according to Webster Fox[12], there is little trachoma among whites except in some isolated parts of Kentucky, West Virginia, southern Illinois, and Ohio. It is common among the Indians. In 1912, of 39,231 Indians examined in reservations

8,940 or twenty-two and seven-tenths percent had trachoma; the percentage varied in different places from sixty-eight and eight-tenths to two-tenths. In 1924 the Indians of three reservations were examined to the number of 18,830; trachoma was found in 3,986, or twenty-one and two-tenths percent.

The foregoing figures are sufficient evidence that there is need for a better control in some countries than exists at the present time, and that no country can relax its vigilance.

Clinical conditions

Trachoma means "a roughness", and a roughness of that silkiest of tissues, the conjunctiva. The name is a good one. In typical cases the roughness of the tarsal conjunctiva is uncanny. The term is an old one, and the disease is old. The disease was described, with an accuracy that will be little bettered today, in the works of Hippocrates and in the later authors of the Greek school; Ætius, Paulus Ægenetus, and Alexander Trallianus. There is one passage in Celsus which may be cited:

> Pejus etiamnum est (genus videlicet lippitudinis), ubi pituita pallida aut livida est, lacrima calida et multa profluit, caput calet, a temporibus ad oculos dolor pervenit, nocturna vigilia urget: siquidem sub his oculus plerumque rumpitur; votumque est, ut tantum exulceretur. Intus ruptum oculum febricula juvat: si foras jam ruptus procedit, sine auxilio est. Si de nigro aliquid albidum factum est, diu manet. At si asperum, et crassum est, etiam post curationem vestigium aliquod relinquit. (Lib. VI, cap. vi.)

The characteristic signs of the disease in its early stages are the slight ptosis of the upper lid, and a variable degree of discharge from the conjunctiva. The membrane shows a profuse overgrowth of the tarsal covering, so that it may look like a plush pile, or be grossly studded with enlarged follicles. Many cases are so little acute that there may be no outward symptoms of the disease save the slight ptosis, and in these the inflammatory process is dry and sluggish, and the harsh roughness of the tarsal membrane is marked.

Whether or not corneal involvement is a necessary clinical character of the disease is a moot point. Wilson[13] of Cairo thinks that it is. Other observers do not admit this. My own experience is that within the first year of the disease in children it is rare, and it may never appear if efficient treatment is begun early; but it is certain to appear in long-standing cases, especially among adults.

The disease is undoubtedly highly contagious. Doctors and nurses have been infected, and inoculation experiments have been done. Perhaps the most dramatic account of an experimental inoculation is that recorded by Treacher Collins[14] in his account of the London ophthalmia schools. Children were loath to leave the lovely country schools to go back to the old-time town barrack schools, and deliberately irritated their eyes to prolong their treatment.

"One child, whose name peculiarly enough was Sly, was admitted with marginal blepharitis and slight conjunctivitis; this was cured and all treatment was stopped preparatory to her leaving the school. She was then caught by the nurse taking discharge from another child's eye who was suffering from trachoma and deliberately putting it into her own. The symptoms of acute mucopurulent ophthalmia rapidly set in, and two months later typical trachoma follicles on the tarsal conjunctiva were recognized. After a year's treatment the trachoma was cured."

The most striking clinical feature of the disease is its chronicity. From six months to two years is its usual duration, and most cases extend to the longer term. So strongly is this impressed upon me that I am critical of my own or of others' diagnosis when a case of suspected trachoma reacts speedily to treatment!

The histological feature of the changes produced by the disease is the extraordinary proliferation of the lymphoid tissue. There is a diffuse lymphocytic infiltration of the conjunctiva with numerous follicles occupying the subepithelial layer. A follicle may measure from 0.5 to 2 mm. in diameter. The periphery of a follicle is formed

of layers of lymphocytes; in the central area are many large mononuclear cells. All the changes are most marked in the retrotarsal fold, but no part of the conjunctiva is exempt. The beginning of a cure is shown by the breakdown of the centers of follicles and the gradual growth of connective tissue fibrils around the follicles. In advanced stages the fibrosis is so extreme that the follicles are strangled by the shrinkage of the scar tissue. Success in treatment is shown in a fine even spread of the scarring. Failure is shown by a gross unequal scarring and consequent distortions of the lids with all their painful and disabling effects. I am inclined to the view that the worst end-results are sometimes due more to ill advised severity of treatment than to the effects of the disease.

The causes of the disease

The control of trachoma needs a knowledge of its cause and of the conditions under which it spreads. The primary exciting cause of the disease is as yet uncertain. There is a general agreement that it has the characters of a distinct entity, and such that it may certainly be ascribed to some virus. There is no doubt that its progress is affected by intercurrent infections, but none of these infections, which are common and well known, appears to be the determining cause. From the days of Koch's investigation of the disease in Egypt in 1883 there have been many attempts to identify specific organisms. So far no claim has been established.

The most recent work is that of Noguchi,[15] a piece of experimental investigation of much promise. His Bacillus granulosis is described as being present in the affected tissues in extremely small numbers in the vicinity of the small and large mononuclear cells constituting the follicles. It has been isolated in cultures; then it is found to have a single polar flagellum. The cultures have been inoculated into monkeys, and have induced conditions of granular conjunctivitis apparently identical with trachoma in man. Wilson[13] of Cairo has published the report of an investigation he has made on the lines of Noguchi's work. His results are indefinite.

If the primary cause of the disease is uncertain there can be no doubt of some of the adjuvant causes. These are conditions of life which can be dealt with. Trachoma is rarely found except among people of low standards of living. It is found among squalid people who are herded together. In these conditions there is a common neglect of what we speak of as sanitary rules, but which may be better described as the rules of civilization.

The easy communal generosity of the feckless has often been noted. Unfortunately this liberality extends to the common use of sanitary articles which in more developed communities are regarded as strictly personal. It is, I believe, to the careless but pernicious generosity of these people that the ready dissemination of eye disease among them is due. When once the distinction of mine and thine in regard to toilet articles has been learned there is a distinct rise in the standard of cleanliness, and therewith a lessened risk of communicable disease.

I have known outbreaks of acute conjunctivitis in schools coincide with the breach of the rule of separate towels; and in no case have I known an outbreak spread where there was a strict reenforcement of the rule. Confirmation of this observation may be obtained in the care of the men of the Chinese labor corps in France. These men at all times carried about their person a towel which was used for many purposes. It was freely loaned to companions. Lister found it necessary to arrange for a regular sterilization of these towels, and he was certain of the efficacy of this procedure.

London schools

In former days the chief breeding places of trachoma in London were the Poor Law schools. The children of destitute families were drafted into huge barrack schools. These schools were ravaged from time to time by epidemics of ophthalmia, which was al-

ways endemic. Stephenson[16] in an historical note, showed that the evil of these schools was known as early as 1848. In 1858 Bowman made recommendations regarding them. Ten years later similar recommendations were made by George Critchett. Nettleship in 1874 inspected all these schools, and of one he stated that "not fifteen percent of the eyes could be described as healthy". A report in 1888 by Littlejohn, the medical officer of one of the schools, in which he said "Children have contracted the disease in the school . . . . to an appalling extent", attracted the attention of Parliament. An isolation school for ophthalmia was provided under the care of Sydney Stephenson.

From later London reports I find that the separate attempts of the local London Poor Law authorities were amalgamated by the Metropolitan Asylums Board. Two ophthalmia schools were established in the country north and south of London in 1903 and 1904 in charge of Treacher Collins. At the time of the foundation of these isolation schools the average number of children housed in the Poor Law schools was 10,800. The accommodation of the isolation schools was 720. In the first year 625 children were admitted, of whom 292, or forty-six and seven-tenths percent, were suffering from trachoma.

The segregation of affected children was so efficacious that in 1918 there were only 186 entries, so one of the isolation schools was closed. In 1921 there was a risk that the other would be closed too for lack of cases. It was therefore determined to admit children also from the elementary schools. Even with this far wider field from which to gather patients the demand upon the resources of the school at Swanley has been below the accommodation. In January, 1930, only 253 of the 364 beds were occupied. Thirty-nine were pauper children gathered from the Poor Law schools with a roll of 6,375 children; twelve were cases from outside London; and 152 were elementary school children. Of the total cases sixty-seven were trachomatous, or twenty-six and five-tenths percent.

A most effective agency in the control of trachoma is the School Medical Service. For the past twenty-five years I have been intimately connected with this work in the County of London. My duties as ophthalmic consultant include work at a consultation center at the County Hall, to which are referred children whose sight presents special difficulties in education or medical treatment.

By act of Parliament the education authority is responsible for the medical inspection and treatment of the school children. The schools are visited regularly and all the children examined in specified groups. Those requiring treatment are referred to their home doctors or to school clinics maintained by the authorities. Parallel with this arrangement there is the School Attendance Department, which has the duty of investigating the reasons for the absences of children from school. Absences of more than a specified period are reported to the head office for special investigation. This dual organization within and without the schools ensures a very complete supervision of health of the children.

The efficiency of the organization Early in 1924 an unusual number of was well demonstrated a few years ago. absences from school on account of external eye disease were reported by the attendance officers in the Thames-side districts of Poplar and Stepney. A batch of the affected children was brought to the consultation center at the head office. I found them to be suffering from early and acute trachoma. Thereupon all absentees and the other children of their families, and also the children of the schools they had attended, were medically inspected. A definite epidemic of trachoma was discovered among the children of a few schools in the poorest quarter close to the docks.

Ordinarily cases of trachoma average a score a year for the whole school population of London. In this year, 1924, the numbers seen were: January,

none; February, none; March, 17; April, 34; May, 51; June, 36; July, 51; August, 2; September, 4; October, 4; November, 10; December, 6; making a total of 215 cases. The affected children were transferred for treatment to the Swanley Ophthalmia School, now under the direction of Stephen Mayou, with the most satisfactory results. The epidemic was confined to the original area of its outbreak, and ceased at the end of the year. I have heard some hard sayings about the school attendance officer. It has been asserted he is as hard-hearted as the pedagogue of a familiar Pauline argument; but his strictness is an invaluable safeguard to the children, as was demonstrated in this outbreak. Imagine what might have happened in densely populated London if there had been no inquisitorial attendance officer.

War conditions

An example of large-scale prevention and treatment is recorded by the ophthalmic surgeons[4,5] detailed during the great war for oversight of the Labor Corps. Large numbers of colored men were brought into France for labor purposes. Trachoma was rife among them. It was recognized that with the proximity in which the individuals of the Labor Corps had to live there was a danger of trachoma becoming universal throughout these units. Had this occurred their capacity for work would have been greatly impaired, and there would have been a risk of the disease spreading to the British troops and to the French population.

The Egyptian laborers were highly affected. At a low estimate forty-five percent were either suffering from or had had trachoma. Of the South African Cape boys only three percent were affected. The main problem was with the Chinese, of whom there were roughly 100,000. The incidence among them was eight percent—that is, about 8,000 cases; besides these were 5,500 cases of suspicious conjunctivitis.

The steps taken to remedy matters were three: (1) instructions were given that no laborers with trachoma should be recruited from abroad, and for those on the voyage sanitary treatment was given; (2) the affected men were segregated; (3) treatment was given to both the affected and the clean; the latter received zinc drops, and their towels were sterilized regularly. The effect of these measures was speedily apparent in the improved condition of the men and of their work.

Conclusions

The evidence presented in this paper points to two certain conclusions: (1) that trachoma can be controlled; (2) that the control of trachoma is a practical proposition. The measures requisite to this control may be viewed from two points: that of the country where the disease is endemic, and that of the country free from the disease. It will be agreed that the principal condition favorable to the spread of trachoma is squalor, the product of bad social conditions. If we can raise the social status of a community, the risks of communicating trachoma will be reduced until they are small—as in England. Social conditions can rarely be effectively altered by outside influences, but this can be achieved if the influence works from within the community.

There is now scarcely a country in the world that does not maintain some sort of system of elementary education for its children. Where there is such a system there is ready to hand the basis upon which an efficient campaign against trachoma can be waged. The recognition that a school for children is a place for the training of the child in the use and care of its body, as much as for the training of its mind, will make the school the most efficient prophylactic against contagious eye disease.

Instruction in the care of the body engenders pride of body, and this in its turn fosters a sense of separateness or fastidiousness which is offended by a community of interests in toilet articles. That lesson is, I believe, one of the chief gains of civilization; without it our cities would be pest centers, instead of ranking with health resorts. It would do more to extirpate trachoma

than any other measure. It would create in countries where trachoma is rife the demand by teachers and parents for routine examination of the eyes of children on entry to school, at specific intervals, and of suspects at all times. Experience in London shows how readily medical inspection, at first resented, becomes demanded as a safeguard to all parties—the child, its family, and the teacher.

Discovery of disease demands treatment. Isolation ophthalmic schools, such as Swanley, are an economic proposition in countries where the incidence of trachoma is low; where it is high such measures are impossible. But it is possible to provide local dispensaries and traveling hospitals after the type of the beneficent foundation of Sir Ernest Cassel in Egypt.

Further, it will be good practice to provide for the issue to the people generally of zinc sulphate drops. Regular and long-continued use of these drops in residential schools I have found safe and of value. There is evidence of their value in the control of trachoma among the coolies of the Labor Corps in France. David[17] in Palestine records that during a local epidemic of ophthalmia the school children were unaffected so long as they used the drops, but they fell victims to the attack when their use was stopped. Maybe there would be a few cases where intraocular inflammations would be injuriously affected by the use of the zinc drops, but even with that risk in view I think the universal use of the drops would be justified in a trachoma-ridden country.

Finally, in such countries there should be a rule reserving appointments to posts in the public services to the healthy, and disqualifying candidates with trachoma. There can be no doubt that such a rule would furnish an effective sanction in a campaign against trachoma.

In a country where trachoma is rare there will be a justifiable demand for the exclusion of immigrants suffering from the disease. In these days of widespread travel the risk of entry of communicable disease into a clean country is great. Quarantine is no service in the prevention of trachoma. The disease is too enduring. Exclusion is the proper remedy. There have been at various times outcries against the action of some countries in rejecting immigrants for failure to attain standards of health. In my view stringent rules as regards health are wholly justified, both for the safety of the one country and for the improvement of the other. The fact that trachoma will exclude the immigrant in any country will do much to awaken the authorities of a trachoma-ridden country to the disability under which its nationals labor, and to the necessity for remedial measures.

In conclusion, I would venture to reiterate my belief that the best line of attack is through an efficient school service. Through this we can get an oversight of the children such as no other means will secure. The school also tends to inculcate a sense of personal responsiblity that is invaluable to the common health. There is no doubt that if we could keep the children of one generation free from the disease trachoma would become extinct.

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INOCULATION OF THE HUMAN CONJUNCTIVA WITH BACTERIUM GRANULOSIS

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Two human inoculations with Bacterium granulosis are recorded. In both cases the organism proved pathogenic for the human conjunctiva, producing a granular eye disease clinically indistinguishable from early trachoma. A monkey inoculated from the first case developed typical trachoma, and Bacterium granulosis was later recovered from this animal.

In previous reports[1] two of us described the isolation of Bacterium granulosis (Noguchi) from cases of trachoma in whites, Indians, a Mexican, and a Japanese and the production of a granular conjunctivitis resembling trachoma in Macacus rhesus monkeys after subconjunctival injection of pure cultures.

The disease in monkeys was characterized by a severe folliculosis appearing first in the fornices and later spreading over the tarsi, accompanied by induration and thickening of the conjunctiva and in certain instances by scar tissue formation. No pannus developed in any of the inoculated animals. The lesions appeared identical with those occurring after inoculation with actual trachomatous material and, in view of the poorly developed lymphadenoid tissue in monkeys it is probable that lesions absolutely corresponding to human trachoma cannot be reproduced.

Bacterium granulosis has been recovered from infected animals in all stages of the disease and it seems that Koch's postulates have been definitely fulfilled. A complicating factor arises, however, in the presence of a spontaneous folliculosis in monkeys, and it has been claimed by some that the lesions believed to be due to Bacterium granulosis are in reality nothing but manifestations of the spontaneous disease. For these reasons we have concluded that human inoculations are necessary to finally prove or disprove the etiological relationship of Bacterium granulosis to trachoma.

A number of inoculations[2] with Bacterium granulosis have already been reported, all save one being negative. The one positive case[3] was described as presenting a typical papillary trachoma six months after inoculation, but in view of the fact that neither scarring nor pannus had yet developed the diagnosis could not be made with certainty. The negative inoculations can perhaps be explained by a loss in virulence of the cultures as we have been able to establish such a loss in our strains after prolonged cultivation on artificial media. It is therefore important to use only freshly isolated strains, previously tested for monkey pathogenicity, when making such inoculations.

The first of our two inoculations was made on Dr. Polk Richards of the Indian medical service, who volunteered for the experiment and whose active interest in the trachoma problem followed his association with Noguchi's original investigation. Unfortunately Dr. Richards was not an ideal subject both because of his age (fifty-two years) and because of previous mild trachomatous infection which had healed with slight scarring and without the formation of pannus. However, the eyes had been completely symptomless for over four years and at the time of inoculation the conjunctivæ were smooth and normal in every respect save the presence of mild scarring, so that we felt that the chances for mere recurrence of his old disease were extremely remote. The inoculation was made on July 13, 1930, the conjunctiva of the left eye being rubbed with mixed monkey tissue and Bacterium granulosis obtained from Macacus rhesus number eight, which was showing very advanced granular lesions, while the right eye was inoculated subconjunctivally in the upper cul-de-sac with 0.5 c.c. of a mixed suspension of five

strains of Bacterium granulosis, obtained from human cases. The most recent of these had been isolated some six weeks previously. The monkey tissue was used in the left eye for the purpose of obtaining maximum virulence of the virus in view of the previously recorded negative inoculations.

Three days later the left eye developed an itching and slight pricking sensation accompanied by some photophobia and also some blurring of vision due to secretion. On examination the upper cul-de-sac presented a distinct hyperemia. The right eye was normal. Following this the left developed what appeared to be an acute catarrhal conjunctivitis, the lids being pasted shut in the mornings. By the ninth day the secretion had diminished considerably. On examination there was marked redness of the caruncle, semilunar folds, and bulbar conjunctiva extending outward toward the cornea; the upper tarsal conjunctiva was thickened and hyperemic especially in the outer third and there were a few slightly raised spots in the upper cul-de-sac. In the lower cul-de-sac there was a suggestion of a faint longitudinal ridge and furrow. The right eye continued normal.

On the thirteenth day the right eye showed mild papillary hypertrophy of the palpebral conjunctiva of the upper lid, with moderate congestion of conjunctival vessels at the upper portion of the tarsus. The outer third of the conjunctiva of the retrotarsal folds external to the old scar had three thickened areas in deeper layers of the conjunctiva which suggested early follicle formation. There was some congestion and thickening of the conjunctiva between the inner border of the tarsus and the inner canthus. The semilunar fold and caruncle were negative. The left eye showed moderate congestion of the bulbar conjunctiva, most pronounced between limbus and inner canthus. There was decided congestion of the palpebral conjunctiva, with fine papillary hypertrophy of the epithelium over the whole tarsal portion of the palpebral conjunctiva. The conjunctiva between the inner edge of the tarsus and the region of the punctum contained several small follicles, with induration of the interfollicular spaces. There were a few small follicles at the outer edge of the tarsus. The retrotarsal fold below showed velvety hypertrophy, with numerous small follicles scattered uniformly over the whole surface. A group of five small follicles occupied the upper half of the semilunar fold. Four small follicles extended outward into the bulbar conjunctiva at the outer border of the semilunar fold. There was marked induration of the conjunctiva of the lower lid and several small follicles were beginning to appear in the palpebral conjunctiva. The lower cul-de-sac was thickly studded with small granules and the interfollicular spaces were indurated.

On the twenty-first day after inoculation Dr. Richards was given a detailed examination by Dr. D. D. McHenry of Oklahoma City, who was kind enough to come to Denver for this purpose. The notes of his examination are as follows:

"Patient wearing dark glasses and complaining of some photophobia. Says corners of eyes contain sticky mucus in mornings. Both eyes moderately reddened. Conjunctival vessels tortuous and engorged, left more marked than right. Few drops of 1 to 5000 adrenalin solution placed in each eye and eyes examined five minutes later. Left eye: Much of redness and engorgement of conjunctival vessels gone. Caruncle slightly swollen and injected. At its outer end are two small follicles almost the color of the rest of the caruncle. Lower two-thirds of semilunar fold injected. The mucous membrane of the upper third is decidedly hypertrophied and in the center of this hypertrophied area are two small follicles about 1.5 mm. in diameter and of reddish-gray color. Just external to the upper third of the fold are three small follicles about 1 mm. in diameter on bulbar conjunctiva. Lower lid: About 2 mm. below edge of lid extending from junction of inner and

middle third to extreme outer end of lid is a row of scattered follicles about size of those in semilunar fold, with distinct hypertrophy of mucous membrane between, in the lower fornix is another scattered row extending along center three-quarters of the fornix. Some hypertrophy surrounding them but not so marked as that near the edge of the lid. On eversion of upper lid all vessels are seen to be traceable from lid edge to margin of cartilage except at each end where the mucous membrane is hypertrophied sufficiently to obscure them. In these hypertrophied areas are nests of small follicles. On smoothing out the upper fornix we find many small scattered follicles 1 to 1.5 mm. in diameter extending from upper end of semilunar fold to within 5 mm. of the external canthus. In places these take on the appearance of rows but they are mostly scattered, a few extending down on the bulbar conjunctiva. There is some thickening of the membrane in the upper fornix, which is however not so marked as that on semilunar fold. The follicles are still small and round but they and the surrounding mucous membrane are of a deep red color.

"Right eye: A few small follicles are found at junction of outer and middle third of lower lid. In upper fornix are a few small follicles with slight thickening of mucous membrane, not sufficient to obscure vessels.

"From the decided hypertrophy of the mucous membrane surrounding the follicles on the semilunar fold, the lower lid, the ends of the cartilage, and the fornix of the upper lid, and from the extension of the follicles to the semilunar fold and bulbar conjunctiva and the deep red engorged color of the entire mucous membrane after the use of adrenalin I would make a tentative clinical diagnosis of trachoma, and in my practice treat it as a suspicious case. I have not found the above conditions in folliculosis."

On the twenty-fifth day of the disease an acute flareup lasting five days occurred in both eyes. Treatment with protargol and copper sulphate was begun and was followed by amelioration of the condition within a few days. Six weeks later the follicles had almost entirely disappeared and the conjunctiva had returned practically to normal. There has been no recurrence to date.

Cultures were made at various times from the secretions. All proved negative for Bacterium granulosis. No attempt was made to remove tissue for culture purposes. On the twenty-sixth and twenty-seventh days of the disease Macacus rhesus number twenty-five was inoculated in both eyes with secretions from Dr. Richards' left eye and the conjunctiva scarified. Semisolid leptospira medium was drawn into a 1 c.c. pipette, instilled into Dr. Richards' left eye, sucked up again and then instilled into both of the animal's eyes and followed by light scarification. On the ninth day granules appeared in both eyes simultaneously and the lesions have progressed typically. At the present time a severe disease is present. Attempts at isolation of Bacterium granulosis failed until recently, when a strain was isolated which has the biological properties of Bacterium granulosis.

A second inoculation was made on another volunteer, aged forty-four years, Myrtle Greenfield, state bacteriologist for New Mexico. Miss Greenfield had perfectly smooth conjunctivæ with no history of previous eye disease. On September sixteenth a saline suspension of five strains of Bacterium granulosis isolated by us from cases of trachoma was instilled into the left eye and repeated every three hours for a total of six times. On September 18th, 19th, and 20th the instillations were repeated in a like manner and on the 21st a single instillation was made. On the 22nd bacteria were taken directly from the tubes with a platinum needle and applied directly to the left eye, at five different times.

There was no change in the appearance of the eye until September 20th, when some secretion and some congestion of the palpebral conjunctiva developed. On the 22nd a number of fine

punctate elevations appeared over both upper and lower tarsi, and on the 23rd the semilunar fold became swollen and red. There was general hyperemia of tarsal conjunctiva, some swelling of lids, and slight ptosis. During the next four days there was no marked change except that the granulations became slightly more pronounced. On the 27th definite follicles were present in rows and the eye had the clinical appearance of early trachoma. Following this there was a gradual diminution in the secretion, congestion, and number of follicles. On October 10th there were only a few scattered follicles and slight congestion. No attempts at isolation of Bacterium granulosis or inoculation of monkeys have been made.

Summary

Two human inoculations with Bacterium granulosis have been made. The first subject, aged fifty-two years, had had a previous mild trachoma which had healed with slight scarring and no pannus. The right eye was inoculated with five old strains of Bacterium granulosis obtained from human cases of trachoma, while the left eye was treated both with excised monkey tissue and with Bacterium granulosis obtained previously by culture from that animal. After an incubation period of five days an acute conjunctivitis developed in the left eye, followed a week later by a milder disease in the right. Follicles later developed, more marked in the left eye, distributed over the bulbar and palpebral conjunctiva, the caruncle, and the semilunar fold, and associated with induration and thickening of the conjunctiva. The condition at this stage was indistinguishable from beginning trachoma. On the fifty-fourth day of the disease an acute flare-up occurred and treatment with silver and copper was instituted; and after six weeks of daily treatment both eyes returned practically to normal. Attempts at isolation of Bacterium granulosis directly from the secretion failed, but a monkey inoculated with secretions developed the typical disease and Bacterium granulosis was later recovered from this animal.

The second subject, aged forty-four years, was inoculated in the left eye with a mixture of five strains of Bacterium granulosis, the most recent of which had been isolated some two months previously. After an incubation period of five days an acute conjunctivitis with secretion developed, followed by the appearance of follicles and some induration of the conjunctiva. The disease regressed, however, without treatment and at the present time only a few scattered follicles and slight congestion remain.

While no conclusions regarding trachoma can be drawn from these two cases, it is certain that Bacterium granulosis is pathogenic for the human conjunctiva, producing a granular eye disease which is clinically indistinguishable from early trachoma. To determine its exact relationship to trachoma further inoculations will have to be made, preferably on younger subjects and with freshly isolated strains of Bacterium granulosis.

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THE INFLUENCE ON OPERATIVE RESULTS OF OCULAR MUSCLE ACTION UNDER SHERRINGTON'S LAW

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In the author's "cinch" method of muscle shortening, the tendon is split into a number of strips which are made to loop themselves about a nonabsorbable material, which is left in place for about three weeks. Further experience with this operation leads the author to suggest that it may occasionally need to be supplemented by a two-stage tenotomy of the opposing muscle, or that sometimes the total effect aimed at must be divided between the four horizontal recti muscles of the two eyes. Read before the Colorado Congress of Ophthalmology and Otolaryngology, August 1 and 2, 1930.

Sherrington proved that impulses are sent simultaneously to opponent muscles to result in contraction of one muscle and relaxation of the other. Hence relaxation of an opponent is an active affair as far as the nerve mechanism is concerned. Duane has explained in detail (Fuchs's textbook, page 329) the part that this muscle action plays in the development of squints. He did not refer to any possible influence it might have on the results of operations on the ocular muscles. Nor have I been able to find such a reference in a thorough search of the literature contained in the medical library of Stanford University. It is fair to assume that the continued action of the muscles, under this law, must have some influence on the result of an operation—more particularly one that aims to increase action, such as an advancement or a resection and shortening.

In my "cinch" method of shortening, the tendon is split into a number of strips which are made to loop themselves about a nonabsorbable material. No suture being used and the material being nonabsorbable, it is evident that no change can possibly occur at the site of operation till after the shortening strands are removed. This is done at about the twenty-first day—a time thought sufficient to permit firm and permanent union of the tendon loops. Therefore, any loss in effect that occurs in this period must be due to some other factor. This operative method, in my opinion, is the only one positive enough in its mechanics to permit the drawing of definite conclusions concerning the reasons for such losses.

I had hoped that such a positive shortening would do away with the need for tenotomy as an aid. In the normal horizontal limits of rotation (100 degrees of arc), each lateral rectus must change its length 20 millimeters (one for each five degrees). From this fact I reasoned that, theoretically at least, tenotomy of an opponent should never be required. This was a purely mechanical viewpoint, for only a few operations were needed to prove the idea wrong in practice. Even excessive shortenings, causing limitation of motion and retraction of the globe, failed to make the eyes parallel.

Case 1. A patient I am now working on had twenty-six prism diopters of left hyperphoria and ten prism diopters of esophoria. Two operations reduced the hyperphoria to eight prism diopters, and it was thought best to shorten an externus to correct the esophoria. This caused a wide divergence (twenty-five degrees of arc) although the internus was not touched. The operated eye was kept covered four days with no change in the divergence. It was then left open and the next morning the test showed six prism diopters of exophoria—a loss of about twenty-two degrees of arc. What made the change?

Case 2. A patient was operated on some years ago for an esophoria of fourteen prism diopters developed by monocular occlusion. The immediate overeffect of twenty prism diopters behaved exactly as in case 1. After some months he tested fourteen prism diopters of esophoria again, but this time on occluding the eye the balance became orthophoric.

In my opinion these occurrences, which are frequent, can be accounted

for only by the continued action of the muscles under Sherrington's Law. The muscle whose tendon is shortened is the one that receives the impulse to relax. The operation cannot abolish that impulse; therefore, the eye is permitted to return more or less to its original position. Hence there is the need for lessening the habit contraction of the opponent by some type of tenotomy. I feel that such work on the opponent ought to be done with that idea, rather than with the usual idea of doing it to prevent the pulling out of the advancement or tucking sutures.

Theoretically, imbalances and squints should be corrected before these innervational habits become too firmly established. This can never be possible with heterophorias, because by the time symptoms occur the habits are formed. Luckily these conditions are rather easily corrected as are squints developing from a phoria after binocular vision has been learned. Squints that develop prior to that time, or so close thereto as to permit the loss of binocular vision, are the ones that give us most trouble.

It is possible, by using my method, to operate at any age that will permit a twenty minute anesthesia, there being no general effect from the operation itself. For fifteen years it has been my practice to operate as close to the third birthday as possible, provided nonoperative measures have failed. Fortunately the majority of squints start at an age that allows the trial of lenses. In this connection I wish to make the positive statement that I have never seen an accurate correction straighten eyes unless it did it at once. Many times I have refracted children who were wearing much too weak a plus correction, whose eyes have been straightened by the full correction; but this is a different situation.

There are patients whose eyes have never been straight or who have a definite abducens paresis or paralysis. These can be safely operated upon by my method, or by transplantation, at the end of the first year, and thus be given an opportunity to learn monocular and binocular vision in the normal manner.

In very young children tenotomies are out of the question. Recessions also are not indicated, because they call for scleral sutures, which in my opinion are unsafe at any age. I like to tell my patients that in my operation the eyeball is not touched, and consequently the chance of damage to vision is practically zero.

Children eligible for such early operation seldom appear in my office, because the family medical advisers are usually successful in their efforts to prevent the early institution of proper treatment. Why they presume to give such advice in a matter about which they are totally ignorant, as proven by the advice itself, is beyond my comprehension. The resultant delay is often the cause of later troubles such as loss of monocular and binocular vision.

When cases finally come to operation, some form of tenotomy is frequently needed to break the habit contraction. Complete tenotomy is too risky to combine with my very positive shortening, as are the various forms of tendon lengthening. As stated before I do not like the recession operation.

In doing a tenotomy as part of a strabismus correction the operator admits, consciously or subconsciously, one or more of the following conditions:

(1) That operations have been started too late to expect complete results from the theoretically correct procedure.

(2) That, when he does a tenotomy as the only operation, he doubts his ability to perform an advancement or shortening and is taking the easiest way out.

(3) That the advancement or shortening he prefers is based on such poor surgical principles as to routinely require the aid of tenotomy to lessen the chance of stitch slippage.

In eyes that are useful, and in those that I hope to make useful, the work that is done on the opponent is never more than what I call a two stage teno-

tomy. The first stage is a central tenotomy leaving uncut marginal bands abou 2 mm. wide. The cut portion retracts and heals to the globe slightly back of its original position. Occasionally this is enough to break the habit contraction. It must be explained to the patient that the first stage is in the nature of a preliminary operation and that often no effect is apparent till the second stage is done. The second stage consists in tenotomies of the two margins leaving the newly healed central portion untouched; this, when necessary, is done a month or more after the first. This scheme, which I believe is original, protects the patient from the production of an overeffect and from the loss of convergence so necessary in cases of esophoria and in those of esotropia where we hope to save or develop binocular vision. Control of the globe is never lost and the dangers of scleral sutures are avoided.

I have operated cases of wide divergence, with absence of inward rotation secondary to tenotomy of the internus, and found the tendon attached to the sclera no more than five millimeters back of the normal insertion. I feel therefore that my cinch shortening, aided when necessary by the two stage tenotomy, and with a division of the total result between the four muscles, offers the safest operative scheme for paralleling the visual axes in all positions of binocular rotation.

There are three nonoperative procedures which I have tried out occasionally prior to operation, with the hope of breaking these habit actions. It is possible that a routine and persistent use of these procedures might occasionally avoid the need for tenotomy of any kind. These recommendations are:

(1) Rotations of the eye in the direction of the muscles to be shortened to teach them to contract and their opponents to relax.

(2) Exercises, in the case of phorias, with prisms so based as to force into action the muscle we intend to shorten, teaching it to contract and its opponent to relax. This is not done with the idea of curing the imbalance.

(3) Weak prisms for constant wear based as for exercise. The reason for using these and the possible increase of symptoms must be explained to the patient. These could be used only in the presence of binocular vision.

450 Sutter building.

A NEW TYPE OF INSTRUMENT FOR TESTING THE LIGHT AND COLOR SENSE

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The instrument here described has been designed primarily for determining the light minimum, but can be used also for detecting the light difference. By insertion of appropriate filters it becomes available for testing the color sense. It can also be used effectively for the detection of very small central scotomata for either light or color. From the research laboratory of physiological optics, Wilmer Ophthalmological Institute, Johns Hopkins Medical School.

The instrument to be described has the following features and advantages:

(1) It is easily portable, quick and convenient to operate, and gives a high reproducibility of result.

(2) The amount of light entering the pupil of the eye, the density of light in the test field, or the brightness of the test field can be measured and the instrument calibrated in terms of any or all of these measurements. The instrument differs from any other instrument that has as yet been described, however, in that all the light in the test field enters the eye. In comparing the results of this instrument with those obtained with any other type of instrument, this fact has to be taken into account.

(3) The results are independent of changes in the size of the pupil, including the changes produced by the use of pilocarpin and other miotics.

(4) Very effective and convenient means for the control of fixation are provided.

(5) The instrument seems to be independent of the condition of refraction of the eye. This permits of a more direct examination of the powers of the retina than is ordinarily the case and adds greatly to the ease and convenience of making the examination. It also decreases the range of difference or the scatter of results in a group of observers. This is a very important feature in the use of the instrument for diagnosis.

(6) Because of the small aperture in the eyepiece the results are further rendered independent of the influence of distance of projection of the image. In monocular vision the distance is ordinarily dependent on the amount of accommodation. The distance of projection of the image and its resultant subjective magnification have a small but appreciable effect on sensitivity.

(7) The size of the test field may be varied through a visual angle ranging from thirty-six to zero degrees. These changes may be quickly and conveniently made. The test field may also be made to have any shape desired. Just what size of field should be used for diagnostic work has not yet been determined. Points to be considered in making the selection are (a) reproducibility of result; (b) the range of scatter of results for nonpathological subjects; (c) diagnostic sensitivity; and (d) control of fixation. In connection with (d) it may be pointed out that a large field renders the results less liable to the variability that is caused by insufficient control of fixation or small residual changes of fixation which defy control. Because of these facts it is of importance for the present at least that the instrument should have considerable flexibility as to possibilities of field size. Range of size is needed too if the test field is to be used also as preexposure field in determinations of the adaptation curve.

(8) Provision is made that the broken circle may be used as test object, in which case an objective check is had on the correctness of the judgment and an additional very effective control of fixation is secured. It can also be used under conditions which test acuity at low illumination, or in fact at any level of illumination desired, with the eye, as already stated, practically independent of errors of re-

fraction. The ability to render the eye independent of condition of refraction, it is scarcely necessary to note, is a very important feature in testing both the retina's power to sense light and its power to discriminate detail. With this instrument the light and space sense can be tested under conditions which apparently render the test independent of the resolving power of the refracting system of the eye.

(9) A wide range of intensity of light is provided under quick and convenient control. The change of intensity is produced without change in the color of the light. The spectrum composition and color temperature of the light can be specified if desired.

(10) To insure the constancy of the efficiency of the lamp a checking standard is furnished, so that at any time the illumination of the test field for a given reading of the scale can be compared with that given by a standard lamp and a corrective change made in the operating current if needed.

(11) The instrument can be used with equal facility in any state of adaptation, light or dark.

(12) All scales can be read by the examiner in the dark, and all adjustments of the instrument can be made without interfering with the state of adaptation of the patient. The scales are illuminated by light from the inside of the instrument. In addition the readings may be recorded by pressing an indicator. The examiner may thus watch the illuminated scale as a guide for his procedure while the test is being made, and also make a permanent record of the settings when needed at any time during the course of the examination without the introduction of extraneous light. Moreover, the eye is placed at once in position and there is no groping to find the test field. A single determination can be made in a few seconds. The construction of the apparatus and the method of presenting the light to the eye are such as to minimize the inconvenience usually entailed in working in a completely darkened room.

(13) If an adaptation curve is wanted, a preexposure field is provided which may be varied through a wide change of size and intensity. The instrument is also very conveniently adaptable to the use of any extraneous means of preexposing the eye to light of the desired intensity.

(14) The instrument can be used for detecting either the light minimum or the light difference. It has been designed, however, primarily for determining the light minimum.

(15) By the insertion of appropriate filters the instrument can be used just as effectively for testing the color sense

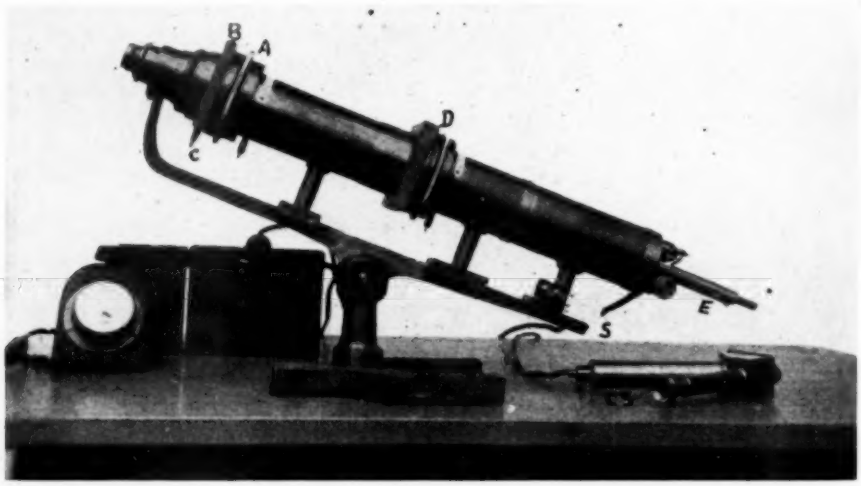

Fig. 1 (Ferree and Rand). Instrument for testing light and color sense.

and the achromatic sensitivity to colored lights as for testing the light sense.

(16) The instrument can also be used very effectively for the detection of very small central scotoma for either light or color,—scotoma of such a size as to be difficult of detection with the perimeter or tangent screen, yet of sufficient importance to reduce acuity.

The general plan of the instrument is as follows: Light from a circular intake, 14 mm. in diameter, is collimated and focussed to an image; the light from this image is again collimated and focussed to a second image which is approximately at the nodal point of the refracting system of the eye. The intake is covered with a plate of diffusing glass and its first image is received also on a plate of diffusing glass. These diffusing plates are of advantage in securing an evenly illuminated test field and in producing a variation of intensity by changing the size of aperture of the focussing lens. The intake is illuminated by a small, well-seasoned lamp, the distance of which from the intake can be varied in continuous change. An eyepiece is provided with a viewing aperture 1 mm. in diameter. The eyepiece does not contain a lens. Various stops and diaphragms, including an iris diaphragm, are supplied for changing the size and shape of the test field and for aiding in the variation of the intensity of its illumination. The optical parts are housed in a tube which is light-tight with the exception of provisions made for the illumination of the reading scales. The instrument is mounted on a U-shaped base and is provided with a tilting adjustment for height.

A picture of the instrument is shown in figures 1 and 2, a diagram of the optical system in figure 3. The optical system is made up of two sets of collimating and focussing lenses, L_1 and L_2, L_3 and L_4, each 65 mm. in diameter. The second of these sets of lenses, L_3 and L_4, the one nearest the eye, furnishes the test field. The principle is that when the nodal point of the refracting system of the eye is placed at the principal focus of a lens which receives parallel rays of light, the lens appears to be filled solidly and uniformly with light. Thus a very satisfactory test field is provided and all the light from this field enters the pupil of the eye. This latter feature is of very great advantage in the calibration of the instrument inasmuch as the amount of light actually entering the eye can be measured. Also it is conservative of light in case high intensities are wanted as preexposure for the eye, as may be needed, for example, when an adaptation curve is to be determined. In accord with this plan, therefore, lens L_3 collimates or renders parallel the light rays for the test field and lens L_4 focusses them on the pupil of the eye. All of the lenses are double convex and of a strength of ten diopters. There is thus no magnification or minification in the system.

The following provisions are made for changes in size and shape of field. (1) At A near the back surface of the focussing lens L_4 and between the two lenses L_3 and L_4, is mounted an iris diaphragm with a range of opening from 6 to 65 mm. At a distance of 10 cm. from the eye this gives a field ranging in visual angle from 3.43 to 36.00 degrees. (2) A grooved cell or holder is located at B immediately in front of the focussing lens in which a diaphragm of any size or shape may be inserted within the range of the size of the lens. One of the devices provided for insertion in this cell is a broken circle. This circle may be made of any size within the limits noted above.

Three advantages may be assigned for the use of a broken circle here. (a) By turning its opening into different positions an objective check may be had on the judgment. That is, the observer may be asked to indicate the direction in which the opening points. (b) Its use provides an excellent control of fixation. That is, the discrimination of a form detail, the opening in the circle, requires that a clear image be obtained and that this image be located on the fovea. And (c) depending upon the size of this opening, the test may be

made to vary in type through the range of an acuity test at low illumination at one extreme to a light sense test at the other. That is, objects are seen because of their size and their sensation difference from the background. When the difference from the background is large and the detail to be discriminated is of threshold size, we have what is called an acuity test. On the other hand when the detail to be discriminated is large and simple in form, and the difference from the background is of threshold value, we have the essentials of the conventional light sense test.

A test for acuity at low illumination doubtless should be added to our diagnostic program. The following are some of its features: (a) The control of fixation is excellent. The discrimination of a threshold detail requires exact fixation and supplies its own check on the accuracy of the accomplishment. (b) By decreasing the sensation difference between object and background through decreasing the intensity of illumination and by requiring the discrimination of detail at the level of sensation difference chosen, the test combines the features of an acuity test with those of a light sense test which may be made, if desired, at a very low level of light adaptation. And (c) a test of acuity at low illumination is quicker and much more easy to make than a threshold test of the light sense, i.e., the annoyances and difficulties of working in a completely darkened room and with complete dark adaptation are avoided. As already pointed out, however, the construction of the instrument and the method of delivering the light to the eye are such as to minimize the difficulties usually encountered in making a test of the light sense in a dark room.

In all probability there is a diagnostic advantage in being able to reach the lower end of the adaptation scale. This can be accomplished in case of the present instrument by using a circular, square, oblong, or other form of field of appropriate size. Or if it is wanted to use the broken circle, very low levels of adaptation can be reached and still enough of the acuity feature be preserved to serve as an objective check on the judgment and as a very substantial aid in the control of fixation by using a circle with a larger opening than accords with the standard scale. The circles used with this instrument are stencilled in very thin plates of hard sheet aluminum.

The cell which holds the stops or diaphragms is also made to hold a filter in an adjoining groove. The bottom of the cell is provided with a plunger,

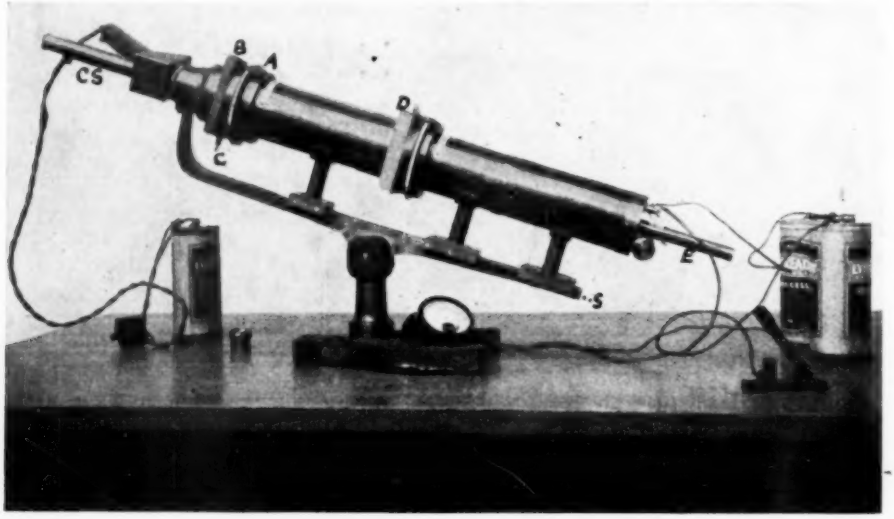

Fig. 2 (Ferree and Rand). Instrument for testing light and color sense.

shown at C, figure 1, to lift the filter for easy and convenient removal. In order to provide for the rotation of the broken circle when desired, the cell is contained in an independent mount which turns freely. On this mount are eight stops which indicate the direction which the opening is wanted to have,—right, left, up and down, and the four forty-five-degree positions. For convenience in rotating the holder a small knob is placed on one side of the holder in line with one of the stops. The position of the knob can be located by touch in the dark. The plate containing the broken circle can be inserted with an opening in any one of four relations to the knob, (right, left, up, or down) that may be desired,—which relation is known to the examiner but not to the patient. The examiner thus is always aware of the position of the opening of the circle and able to check the correctness of the patient's judgment*. The stops are provided as follows. The back wall of the collar of the holder contains eight very small shallow cups in the eight positions which the opening of the circle is wanted to have. In the wall of the collar of the stationary mount for lenses 1 and 2 and the iris diaphragm, immediately back of the holder for the broken circle, a small ball is sunk against a spring (to give it tension) at the proper level to engage the cups as they pass in rotation. The top of the cell is closed by a narrow slide to hold the filters in position during rotation.

The test field presented is viewed through an eyepiece with its aperture at a distance slightly less than the focal length of the field lens. The front of this eyepiece is concaved so as closely to fit the front of the eye. The aperture in the eyepiece is 1 mm. in diameter. It was made of this size in order that it might be smaller than the pupil of any eye that might be examined, even when under the influence of pilocarpin or other miotic. The results of the test are thus safeguarded against all variation due to changes in size of the pupil. Also an aperture as small as this when placed in close contact with the eye renders the observation practically independent of the refracting system of the eye. The broken circle viewed at its distance of 10 cm. from the aperture can be seen clearly, for example, by high hyperopes and presbyopes, and is seen equally clearly in any position in which it may be turned by eyes having a high astigmatism. Indeed with this eyepiece held in position in front of the eye, there is apparently no clearly defined near point, i.e., sufficiently clear vision is present as near as the object can be brought to the eye for the discrimination of the details of small print. In this connection it may be noted that artificial pupils are usually placed at too great a distance from the eye for satisfactory results.

The lens system located farther from the eye and next to the light intake is designed for the control of intensity. It also is made up of two ten-diopter lenses, L_1 and L_2, one for collimating the light from the intake, the other for focussing it. Between these two lenses is an iris diaphragm, range 65 to 5 mm., which is used to decrease the volume of light focussed into the image. That is, the purpose of this lens system with its appended iris diaphragm is to vary the intensity of light which enters the eye; the purpose of the lens system and iris previously described is to present a test field whose size can be varied independently of the changes in the aperture of the lenses which are used to vary the intensity of light. At D immediately in front of the lens system is a double cell for the reception of filters, neutral or colored as may be desired. For their convenient insertion and removal the filters are held in a double container provided with a nib or grip at the top which can be easily located in the dark. This holder is lifted up for the removal or insertion of filters.

* We have found that an oblong field rotatable into any of the eight positions also affords an excellent objective check on the patient's judgment in testing the light minimum. It has the advantage too that it serves equally well as a check at all levels of adaptation from high to extreme low.

The iris diaphragm for each lens system is provided with a slender pointer which moves over a transilluminated graduated scale. The light illuminating this scale comes from the inside of the tube. In order that the illumination of each scale might be independent of the light illuminating the test field, a small (grain of wheat) lamp is set in the opposite wall of the tube directly beneath each scale. These lamps are on the same circuit and can be turned on or off at will by a small switch shown at S. The instrument is calibrated in terms of the graduations on the scales. In one case the calibration is in terms of size or visual angle of test field and in the other in terms of photometric intensity. The photometric calibration may be in lumens, foot candles, meter candles, or lamberts. The most suitable unit for calibration of the amount of light entering the eye is the lumen, the unit of emission or quantity of light. The lumen may be defined as the amount of light emitted in a unit solid angle (steradian) from a source of one candlepower. The calibration would probably be in terms of millilumens (one-thousandth of a lumen), or some smaller subdivision arbitrarily selected.

The relation of the lumen, the photometric unit of amount or quantity of light, to the foot candle and the meter candle, the units of density of light on a surface or of illumination, may be expressed as follows. A surface of one square foot receiving one lumen of light on a square foot is said to have an intensity of illumination of one foot candle; a surface receiving one lumen on a square meter, a meter candle of illumination. If a calibration is to be made in terms of density of light in the test field, then the units used will be the foot candle, the meter candle, the kilometer candle, or one of their subdivisions.

If the calibration is to be made in

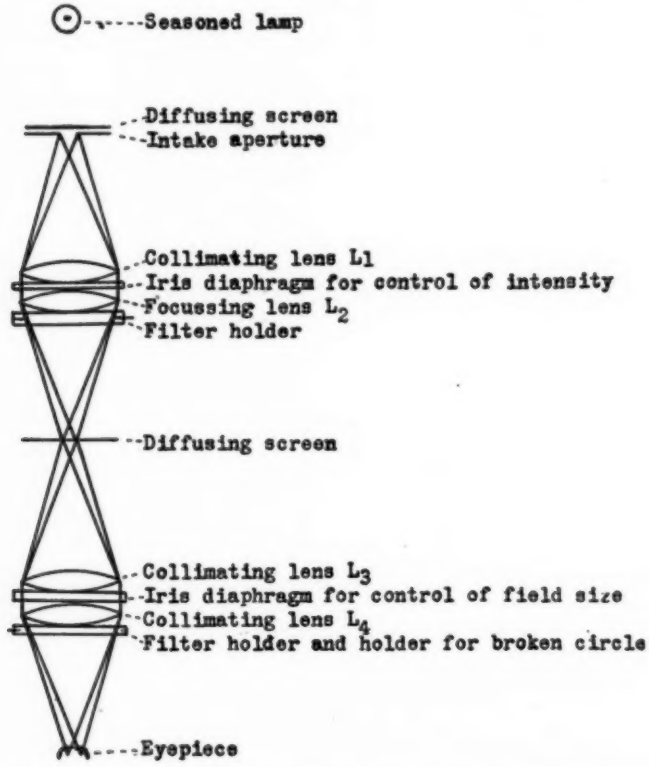

Fig. 3 (Ferree and Rand). Instrument for testing light and color sense.

terms of brightness, the units available are candle power per square inch, candle power per square centimeter, candle power per square meter or square kilometer, or the lambert and its subdivisions. The brightness units were devised to express candle equivalents of illuminated or luminous surfaces. The lambert may be defined as the brightness of a perfectly diffusing surface emitting one lumen per square centimeter. Subdivisions are the millilambert and the micromillilambert. The terms candle power per square inch, candle power per square meter and candle power per square kilometer are self-explanatory.

As an additional means of making small changes of intensity, particularly essential near the threshold of sensation, the distance of the lamp from the intake of the optical system can be varied through a satisfactory range by means of a rack and pinion adjustment. The lamp is mounted at the end of a rod which passes through an opening in the diaphragm at the end of the instrument farthest from the eye. This rod, E, carries a graduated scale which passes under a fixed pointer. This scale can also be calibrated in terms of any of the units mentioned above. It too is illuminated by light from the inside of the tube. That is, a small bit of polished metal mirror located just above the pointer reflects the light directly on the scale from a small slit in the diaphragm closing the end of the tube. The instrument is thus self-contained as to devices needed for reading its various adjustments. No extraneous sources of illumination are needed.

For the control of intensity, three means are thus provided: the use of neutral filters for the gross control, the iris diaphragm, and the distance of the lamp from the intake for the finer control. In the use of the instrument for the simple detection of the threshold it will probably be found of advantage to provide an upper limit of intensity by the use of a filter and a given setting of the iris diaphragm, and to vary the light towards the threshold through the range thus provided, by changing the distance of the lamp with the rack and pinion adjustment. For the determination of adaptation curves and the use of the test field as preexposure, however, a greater range and flexibility of control of intensity is needed. This is amply provided for by the utilization of all three types of control.

Provisions will be made also for making a record of the settings of the instrument during the course of the examination without the introduction of light into the room. These provisions are as follows: (1) the adjustment of the iris diaphragms. On the outer wall of the tube of the instrument just in front of the diaphragm, a substitute holder is made into which paper scales may be easily inserted and fastened. The graduations of these scales duplicate those on the illuminated scales. Fastened to the milled ring which operates the iris diaphragm is an indicator with a sharp punch which passes over the scale as the ring is turned. When the indicator is pressed the graduation on this scale is punched which corresponds to the graduation underneath the pointer on the illuminated scale. At the end of the examination the paper scale is removed and a fresh one inserted. By making the punch a pencil point, the dot can be erased and the same scale used for several examinations if desired.

(2) The adjustment of the distance control. To act as a control, the rod (on the end of which is the lamp illuminating the intake) passes through a tube. At a suitable place near the "lamp-end," this rod is planed off to give a surface for graduation. For the viewing of these graduations a slot of suitable dimensions is cut in the enclosing tube. As the rod is moved back and forth the graduations pass under a pointer fastened to the tube at one side of the slit. These graduations, illuminated as described earlier in the paper, serve as a guide to the procedure during the course of the examination. At the farther end of the tube a holder is mounted into which a paper scale, graduated in duplicate with the illu-

minated scale, may be inserted. At the end of the rod is fastened an indicator at the end of which is a punch which travels over the graduations on the paper scale. When this indicator is pressed, the scale division is punched which corresponds to the division under the pointer on the illuminated scale.

The checking standard CS is also shown in figures 1 and 2. In figure 2 it is shown in position for use. It comprises a photometric field, an illuminating tube with a standard lamp, and an eyepiece. In using this standard, the eyepiece of the light sense tester is removed and the short receiving tube of the checking standard is inserted in its place. When in this position the image from the test field formed by the light sense tester is received on the inner half of the photometric field and the light from the illuminating tube on its outer half. With the rheostat in circuit with the light sense tester, which is set to give the same reading of the ammeter as was used in the calibration of the instrument, and with a given setting of the standard lamp and reading of ammeter, the light is varied in the test field until the half of the photometric field receiving the test image matches in brightness the half illuminated by the standard lamp. The two readings of the ammeter and the reading of the intensity scale of the test field and of the distance scale of the standard lamp constitute the data needed for the use of the checking standard.

At any future time with adjustments made in accord with these readings, the two halves of the photometric field should match unless there has been a change in the efficiency of the test lamp. If there has been a change, the amperage of the test lamp is varied by means of the resistance in its circuit until a match is again obtained. The experiments are then conducted with the lamp operated at this amperage. When the test lamp has become old and its efficiency varies rapidly, it should be discarded and a new lamp used. To determine the correct amperage for the operation of the new lamp the checking standard is again used. A quick means is thus provided for checking the efficiency of any lamp and of insuring at all times that the instrument is giving the intensities represented in its calibration. The lamp of the checking standard can be expected to remain constant almost indefinitely since it is operated for only a few seconds at a time.

In order to give ease and precision to the comparison of the brightness of the test and checking field, the light illuminating the two fields should be closely similar in color. This is accomplished by using the same type and wattage of lamp and the same kind of diffusing screens in the checking standard as are used in the instrument. Low voltage lamps operated on dry cells can be used as in figure 2, or, if preferred, low wattage lamps operated on the lighting circuit. If the current is taken from the lighting circuit a voltage regulator, shown in figure 1, should be used to give constancy of current. Small portable regulators can be obtained which give sufficient constancy of current for the purpose of the test.

It is obvious that used in connection with the checking standard the instrument can be employed quite effectively for determining the light difference as well as the light minimum. There can be no better and more sensitive field for determining the light difference, for example, than the type of photometric field contained in the checking standard, the inner half of which can be varied minutely in brightness from the outer half and the two fields can be so arranged as to give the maximum of contrast. When so used, however, the lamp of the checking standard should be replaced by another lamp, i.e., the standard lamp should be used as little as possible. With the distance of the lamp adjustable as it is in the checking standard, the light difference may be obtained at different levels of intensity through a wide range of intensities. It seems probable, however, that the light difference has its maximum of diagnostic significance at very low levels of intensity—levels which lie close to the light minimum. More importantly,

perhaps, than the sensitivity to light, the power to change this sensitivity, namely, the adaptation process, is affected by pathology. In any event the adaptation process should not be left out of account in the formulation of our test procedure.

By the insertion of the appropriate color filters the instrument can be used as effectively for testing the color sense as for testing the light sense. The work which we have done thus far on pathological cases in perimetry, scotometry, and blind spot determinations has convinced us that in the paracentral and peripheral field the testing of the color sense far surpasses the testing of the light sense in diagnostic sensitivity. There seems good reason to suspect that this may also be true of testing in the central field. The specification of the results of testing the color sense presents difficulties of course due to the lack of units for measuring color. We hope, however, to devise a means for making a specification that will be satisfactory for clinic purposes. It certainly can be done as satisfactorily for work in the central field as it is for the work in the paracentral and peripheral field in perimetry, scotometry, and blind spot testing. The instrument can also be used very effectively for testing the achromatic sensitivity to colored light. We have some evidence to indicate that the testing of this function may be of considerable value in diagnosing and studying pathological conditions.

We find that the instrument can also be used to great advantage in testing for central scotomata which are so small as to escape detection in work on the tangent screen. These scotomata are indicated by a reduction of acuity which can not be remedied by any correction of refraction. By using a broken circle as test object with an opening so small as to be near the threshold of acuity, the patient with such a scotoma fails to detect the opening. The control of intensity provided in the instrument is a valuable feature in enabling the detection of defects representing different degrees of depression of sensitivity. The test can be made for a scotoma for color by covering the opening in the test object with a small bit of gelatin filter. That the failure to detect the opening is not due to an uncorrected error of refraction is ensured by the small aperture in the eyepiece (1 mm. in diameter) which as already stated when placed close to the eye renders the eye practically independent of refraction.

Wilmer Ophthalmological Institute.

TWO PARTICLES OF STEEL IN ONE EYE

CHARLES N. SPRATT, M.D., F.A.C.S.
MINNEAPOLIS

Two fragments had been indicated by the x-ray plates, but a second application of the magnet failed to withdraw a second fragment. A new set of x-ray plates confirmed the previous record, and after a new incision approximately placed the magnet withdrew the second fragment.

Multiple foreign bodies in an eye following explosions or shotgun accidents are not uncommon, for several pieces of rock or copper or two or more shot may be found lodged in the globe. The possibility of two particles of steel entering an eye would seem somewhat remote. Murray[1], Randolph[2], and Lagleyze[3] have each reported cases of two particles of steel in an eye. Randolph especially emphasized the necessity of good x-ray pictures in every case of suspected foreign body. Lagleyze reports a case in which there were two foreign bodies. One was removed, but the eye did not become quiet; a second x-ray picture taken two months later revealed another foreign body. The eye was lost and the steel was found imbedded deep in the retina.

Report of case: M.S., aged seven years, was seen by me on July 23, 1910. Six days previously something had struck the right eye while he was pounding two hammers together. The vision had been immediately lost. The examination showed an infected crescent-shaped wound 3 mm. long, above the center of the cornea. There was considerable irritation and ciliary injection, the anterior chamber was shallow, the pupil was small, the iris had a dirty greenish color, and the lens was opaque with a yellowish tinge. X-ray plates showed two lance-shaped foreign bodies localized in the vitreous.

The patient under a general anesthetic, a conjunctival flap was turned back and an incision was made in the sclera near the ora serrata. The magnet was introduced and a foreign body was promptly removed. The magnet was inserted again and no foreign body was found. It was thought that there must have been an error in the x-ray plates, and the next day a new series of plates was made. One foreign body was still located in the vitreous. A second operation was performed under ether through a new incision. The point of the magnet was placed at the point at which the foreign body had been localized, and a second piece of steel was removed. The eye quieted down, and the boy returned home in twelve days. Three years later the eye was removed, for it was sightless and was causing some irritation.

These cases show the importance of good x-ray pictures carefully studied, for there is always the possibility of more than one foreign body. In my case, confusion arose from the fact that the second insertion of the magnet did not remove the second foreign body. As the patient was a small boy, the possibility of an error in taking the picture was considered, for the moving of the eye during the exposure could give a double image. The second series of x-ray pictures definitely showed a single foreign body. My patient showed only one wound of entry, as did the patients of Murray and Lagleyze. Randolph stated that there was no apparent wound of entry in his case.

These cases also show the unreliability of the use of the giant magnet as a diagnostic aid. The sensation of pull might be positive for only one particle, while a second, not being suspected, might be overlooked. In any injury more than one plate should be made at different angles, for a foreign body may not show if it is very small or in line with the dense bone shadows cast by the orbital margins.

1231 Medical Arts building.

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[1] Murray, W. R. Two splinters of steel removed from the interior of the eye with the magnet. Jour. Minn. State Med. Assoc., 1906, July 1.

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MORE ABOUT ERNST FUCHS

1. Interesting details of his life

(Excerpts translated from an obituary address by Professor K. Lindner of Vienna, read before the Gesellschaft der Aerzte, Vienna, November 28, 1930. Professor Lindner's address furnishes much information of a personal character which does not seem likely to reach American readers from other sources. An excellent account of certain aspects of Fuchs's professional career and relationships is presented by Mr. Treacher Collins in the February issue of the British Journal of Ophthalmology.)

The death of Professor Fuchs on November 21, 1930, was quite unexpected. He had recently made a series of difficult journeys in South America, sometimes at sea level in tropical heat, sometimes in mountain atmospheres at elevations of ten thousand feet, using the airplane for quick connections from place to place. By all this his health seemed in no way disturbed. His end occurred after an illness of only a few hours, shortly after returning from a journey to Italy.

The Fuchs family came from the Bohemian forest, near the Bavarian border, where Ernst Fuchs's forbears lived as poor farmers. His grandfather migrated to Passau barefoot, with twenty marks in his pocket and a loaf of bread for sustenance by the way. Ernst Fuchs's father, Hofrat Professor Dr. Adalbert Fuchs, born in 1814, at first studied medicine, but had to interrupt his studies for two years on account of hemoptysis. He recovered his health on a Polish country estate, where he became very much interested in agriculture. He returned to Vienna and took his doctorate in medicine and later in philosophy. However, he did not practice medicine, but became a professor of natural sciences in Tarnow, where he again became interested in agricultural problems. In 1848 he settled in Innsbruck as professor of zoology, and two years later he was called to Vienna as professor of agriculture.

Ernst Fuchs was the first of three children, and grew up in Vienna. He spent his vacations in Kritzendorf, on his mother's father's estate, the home of his declining years and the place of his burial. His youth was passed in rather penurious circumstances. He never had butter on his bread. He later noted as a special reminiscence that once when invited to visit a neighbor a soft egg was put before him, a detail which he could never forget.

Early in life Fuchs developed a fondness for natural science, and if he could have had his wish he would have been an astronomer or a physicist. His father wanted to make an engineer of him, and in later life Fuchs himself could not remember why this plan had not been carried out.

An anecdote illustrates his lifelong fondness for becoming acquainted with facts at their source. He had heard that in the Danube between Kritzendorf and Klosterneuburg there was a whirlpool which sucked even good swimmers under water. This was in his early college life. He persuaded friends to take him to the spot and jumped from his boat into the water. The whirlpool seized him and he was hauled into the boat half-conscious.

His medical studies were pursued in the brilliant period of the Vienna school, and his teachers included Hyrtl, Brücke, Rokitansky, Skoda, Billroth, and Arlt. Brücke exerted the greatest

influence upon him and young Fuchs almost became a physiologist. In his fifth year of study he declined an assistantship with the ophthalmologist Becker at the Heidelberg clinic. A little later, upon Brücke's recommendation, he accepted an assistantship in the physiological institute at Innsbruck, where he stayed a year. During his time at Innsbruck he made extensive tours in the mountains, and his love for the mountains persisted undiminished from that time to his latest years.

His wish to become a physiologist was shattered by recognition of the fact that his limited means would not permit of further theoretical training. His monthly allowance from home was only five gulden (two and a half dollars). He returned to Vienna in the winter of 1873.

Next to Brücke he was most attracted by Arlt and Billroth. So he went first with Arlt as an unpaid assistant ("Aspirant"). After a while Arlt induced him to submit himself in the first place to surgical training, so that for two years he became Billroth's pupil at operations. During this period occurred the introduction of antisepsis by Lister, who in person spent two weeks in Vienna for this purpose. Fuchs was now seriously occupied with the thought of becoming a surgeon, but, after his two years with Billroth, Arlt offered him an assistantship in the eye clinic. A noteworthy detail is the fact that during his assistantship with Arlt he gave the first medical courses in Vienna in the English language.

From this time his advance was rapid. After scarcely five years of assistantship, at the age of thirty years, and while he was still occupied with plans for sea voyages and even for emigration to America, in 1881 he was called as professor of ophthalmology to Liége. He left that city at the age of thirty-four years to become leader of the Second Eye Clinic in Vienna. This was in 1885.

Fuchs's extraordinarily wide sphere of influence as a teacher was greatly augmented by his unique textbook of ophthalmology, first published in 1889. He himself has emphasized the fact that he became more widely known through the textbook than through all his other scientific activities put together. It was translated into the language of every civilized country, and has often been spoken of in America as the bible of the ophthalmologist.

Fuchs occupied an exceptional position as research clinician. His keen powers of observation were supported by a very extraordinary memory and by an inexorable self-criticism. As an example of the way in which, out of an enormous clinical experience, he gathered together records of cases seen at wide intervals of time, to establish a new clinical entity, may be mentioned the fact that his original description of epithelial dystrophy of the cornea was based upon thirteen cases seen in the course of ten years among over two hundred thousand new cases. Since his description of the disease, further observations have not demonstrated any greater frequency.

Fuchs was the author of numerous medicinal and surgical novelties, and it may be mentioned that the number of his original works exceeds two hundred and fifty.

He assumed a strictly ethical attitude toward all his responsibilities. He offered his patients the best medical knowledge, and his management of the clinic was hardly to be excelled. His extraordinary memory allowed him to keep every individual case in mind. He would never allow any sort of experiment to be made upon patients, unless consistent with a definite therapeutic purpose. He rejected any testing of methods of treatment which offered an element of risk for the patient.

Fuchs examined his students strictly, in the interest both of the patient and of professional standards. It is impossible to overestimate the importance of this fact, although it is certainly easier and more agreeable to make only moderate demands upon the student.

Seldom has any physician possessed a better knowledge of general medicine

than Fuchs. When, at the Rockefeller Institute in Peking some years ago, he delivered an ophthalmoneurological address, the head of the eye division of the Institute was asked by the chief of the neurological department whether Fuchs had not originally been a neurologist. His intellectual activities also reached out into nonmedical departments. He had a special predilection for geology and related subjects. He traveled in remote parts of Europe at times when traveling was not only difficult but often even dangerous; and upon his return he was always able to give his listeners a comprehensive account of what he had seen. Returning from his Scandinavian travels in 1875, he was the first to introduce skiing in Vienna. Not only as a listener, but actively, he was a member of the Vienna Geographical Society, and he delivered noteworthy addresses before that organization, the most recent of which was a very fascinating account of Abyssinia.

He was an expert botanist, and loved and cultivated rare plants. He interested himself in literature, art, and the history of art, and was a steady visitor at exhibitions and a frequent guest of the civic theater.

His skill in languages was admirable. Beside English, French, and Italian, which he spoke and wrote fluently from his early days, he had never forgotten his Latin and Greek. He learned modern Greek, and even, toward the seventieth year of his life, Spanish, which he later not only spoke fluently, but employed in numerous addresses and in the course of his teaching in Spain and South America.

In spite of all his natural endowments and accomplishments, notwithstanding his professional successes, he always remained simple and modest. His mode of living knew nothing of luxury or superfluity. At the age of sixty-five years he retired from the leadership of the clinic, yet the works published by him since his retirement number at least ninety-nine, most of them being developed from his unique collection of pathologic and histologic specimens.

2. Early memories by Adolph Barkan

(For many years professor of ophthalmology in Cooper Medical College and Stanford University school of medicine, San Francisco, Dr. Adolph Barkan now resides at Zurich, Switzerland. He knew Professor Fuchs from the beginning of the latter's professional career.)

When a student of medicine in Vienna, between 1861 and 1869, I was a devoted student of ophthalmology under great masters, including Arlt, Jaeger, Stellwag, Bäcker, and a host of other young, talented men. At that time Fuchs was one or two years short of finishing his curriculum in the famous old Latin school in Vienna, presided over by the learned order of Benedictines.

He entered the medical profession about five years after I had finished my own studies and when I had emigrated to the United States in response to a call as house physician to the Maryland Eye and Ear Infirmary. Eight years later, on the occasion of my first return visit to Europe and Vienna, I met Fuchs as first assistant to the ophthalmic clinic headed by Professor Arlt.

During my eight years' absence, the city of Vienna had been greatly changed. The walls of the old city had fallen, and the Ringstrasse with its magnificent buildings, which even today excite the admiration of visitors to that splendid city, was in course of construction. Scientific medical methods pervaded all the hospitals, and foreigners from all parts of Europe, as well as from oversea countries, came there to perfect their medical education, attracted by such men as Skoda, Billroth, Arlt, and Hebra.

The abundant material of the hospital, the liberality with which it was put at the service of foreign guests, made Vienna, the Alser-Vorstadt, and its

many restaurants and coffee houses (in the few leisure hours which arduous work in the hospital allowed for recreation) an international focus for good comradeship and helpful, mutual work.

Fuchs, then first assistant of the clinic, consented to give me a "privatissimum" in operative surgery. During a few weeks, at an appointed hour, I met him in his room, or in the pathological laboratory; being, during the appointed hour, his only pupil. On innumerable eyes of various kinds, including those in the human cadaver, he gave me instruction with almost painful regard, so it appeared to me then, to every possible operative detail. He was unassuming yet most efficient. The "privatissimum" embraced ten hours, and the fee amounted to ten Austrian florins for each hour (about five dollars).

Fuchs was entirely free from the appearance of dash and amiability, from the genteel assurance of most of the young assistants who furnished the material for professorships in that period. So little was he himself aware of his great gifts of observation, of teaching, of skill and knowledge in every branch, that when his assistantship came to a close, after about four years, he earnestly considered emigrating to a South American university. His passage to his future destination was already bespoken and he was to leave in two months. But one day an old man of gentlemanly appearance, a doctor of medicine, was accorded permission to visit Arlt's clinic. After a few days of observation he came to Fuchs and said that he had been commissioned by the Belgian government to visit the clinic with authority to offer the professorship of the university of Liége to whomever he thought best fitted for the position; and that he offered it to Fuchs. Fuchs accepted at once, became engaged to a young lady of his circle, and went to Liége.

(Some further details mentioned by Dr. Barkan have been omitted because they repeat what is more fully stated in the excerpts from Professor Lindner's obituary.)

A few months ago I attended the memorial meeting held by the ophthalmic society in Vienna. In the company of one of Fuchs's surviving daughters who had always been near to his heart as well as to the hearts of my own family, I stood before the freshly made grave in the little village cemetery at Kritzendorf and took leave of my life-long friend and teacher. Tears gave expression to my pent-up sadness. I gently pressed my hand upon the cold stone and thanked God for the blessed friendship which so long had beautified my life.

NOTES, CASES, INSTRUMENTS

REPORT OF A CASE OF UNILATERAL EXOPHTHALMOS DUE TO AN INTRAORBITAL ANEURISM

H. L. Hilgartner, M.D.
W. E. Watt, M.D., F.A.C.S.
Henry L. Hilgartner, Jr., M.D.
AUSTIN, TEXAS

Wheeler and Hanford have recently reviewed the literature on pulsating exophthalmos and reported an additional case; in this case both carotids were ligated, but finally the globe was enucleated. The case of Wheeler and Hanford is similar to ours in that the pulsating exophthalmos in both cases followed an injury.

Our patient was first seen on May 12, 1930. He complained of undue protrusion of the right eye and of a blowing sound which was synchronous with the heart beat. He also stated that seven months previously he had been stabbed over the right eye, the blade passing in front of the supraorbital ridge down behind the globe. He had been unconscious for some time. When he had regained consciousness, he was annoyed by a blowing sound. On examination, the left eye was normal. The right eye showed marked exophthalmos and edema of the conjunctiva; a loud bruit could be heard. R.E.V. 10/200. A diagnosis of aneurism in the orbital fossa was made, in view of the fact that there was no evidence of the knife having entered the cranial cavity.

Two days later, on the 14th of May, with the patient under a general anesthetic, a Krönlein operation was performed. After sufficient exposure had been obtained, a large, pulsating, thick-walled vessel was dissected from the surrounding tissues. The pulsation could be felt along the entire course of the vessel, which extended from the sphenoidal fissure to the globe. After the vessel was ligated twice with heavy silk at its point of emergence through the fissure the pulsation of the globe disappeared. Except for a severe conjunctival edema, which gradually subsided, the postoperative course was uneventful.

In this case the carotid artery was not ligated, because we felt that the aneurism was in the orbit and not between the internal carotid artery and the cavernous sinus. That this assumption was correct was proved by the operative findings and the relief that the patient experienced following the operation.

209 Norwood building.

CONTAINERS FOR SOLUTIONS

M. F. Weymann, M.D.
LOS ANGELES

A very convenient method of keeping sterile hypertonic solutions for subconjunctival injection is to place them in ordinary rubber-capped vaccine bottles. These bottles may then be boiled in the ordinary sterilizer for five minutes or longer, after which the solution is removed in the desired amounts by puncturing the cap with the needle as one does with prepared vaccines.

The labels are put on these bottles, as well as on all my dropper bottles, with ordinary white oil paint by means of a fine brush. After once becoming dry these labels will not wash off and will even stand repeated boilings. When brown glass bottles are used the white paint stands out very distinctly.

2007 Wilshire boulevard.

SOCIETY PROCEEDINGS

Edited by Dr. Lawrence T. Post

CHICAGO OPHTHALMOLOGICAL SOCIETY

November 17, 1930

Dr. Harry Gradle, president

Two cases of primary optic atrophy

Dr. C. V. Crane presented two cases from Dr. George F. Suker's service at Cook County Hospital. The first, a male of thirty years, was first seen November 5, 1930, with vision of 10/200 and 3/200 in the right and left eyes respectively. He complained of gradual loss of vision during the past five months. The pupils reacted sluggishly to light, normally in convergence. There was marked pallor of both optic discs. Wassermann reaction was 1+; spinal fluid Wassermann 4+. There was marked concentric constriction of both fields. A cisterna magna puncture was made, revealing negative pressure, and 8 c.c. of spinal fluid was withdrawn with a syringe. One-fiftieth of a grain of bichloride of mercury added to 2 c.c. of spinal fluid was injected. The next day 0.6 of a gram of neoarsphenamine was given, and this was followed by a severe reaction, headache and nausea. Vision improved to R. E. 12/200; L. E. 3/200. The fields remained unchanged.

The second patient, a colored male sixty-one years of age, had right vision of 10/10, left vision counting fingers at two and one-half feet. The loss of vision in the left eye had been of two months' duration. The right pupil measured 1.5 mm., the left 1 mm. and the pupils did not react to light or accommodation. Tension was 18 and 17 mm. respectively, with the Schiøtz tonometer. There was pallor of the optic discs. Blood Wassermann was 1+, spinal fluid 4+. The fields showed marked concentric constriction in both eyes. There was slight reaction to the injection of bichloride of mercury; two injections, the first 1/50 gr. and the second 1/33 gr., being given fourteen days apart. The fields were practically unchanged. Vision was now R. E. 12/10—4; L. E. 2/10.

Discussion. Dr. George F. Suker said that these two cases were shown as an illustration of the futility of other treatment in tabetic optic atrophy. The injection of bichloride of mercury had a real value, not that the fields of vision or vision itself could ever be restored to normal but that the remaining vision could be held in many instances. Whatever portion of the nerve was atrophied remained so, but removal of pressure from the nerve and cessation of the spirochetal activities would improve vision. Injection should be made into the cisterna magna, rather than into the anterior horn of the lateral ventricle. The patient should be in such position that the cervical vertebræ were in direct line with the spinal column, the head forcibly flexed upon the chest, to give maximum space between odontoid and atlas, so as to avoid striking the pons or medulla. As much as 15 or 20 c.c. could be withdrawn: in one of the cases shown it was necessary to use a syringe on account of the negative cisternal pressure. Usually after two or three injections a negative spinal Wassermann was produced, and it then commonly remained negative. Once it was definitely decided that there was an active syphilitic process in the optic nerve, this treatment should be given consideration. The cisterna magna route was the most efficacious.

One of these cases already showed improvement in vision from counting fingers at two feet to 2/10, and if the spinal Wassermann became negative the patient was apt to maintain that vision, though there was no idea of restoration of normal vision or normal fields. A case which had been operated on in 1916 still maintained practically normal vision, and the Wassermann had consistently been negative. No

other treatment had been given than six or seven mercury injections. It was not a serious operation, and offered the only hope of maintaining even for a time what vision remained. A certain number of patients with tabetic optic atrophy would remain stationary for years, but eventually would go blind, and if this could be avoided by injections of bichloride of mercury it should be done. The most favorable cases were those in which one eye had relatively good fields and good vision, while the other eye had begun to fail.

DR. SANFORD GIFFORD said that about the first case he had seen treated in this way was by Dr. Suker. That patient was watched for three years until his death by suicide; vision had improved from 20/50 to 20/30 in the right eye, and from 20/30 to 20/25 in the left eye. The fields had increased, and this vision was maintained until death. One case which had been under observation for seven years still had vision of 20/200. The spinal fluid would usually become negative under this treatment if there were no paresis; otherwise no benefit was derived.

Congenital ptosis: partial paralysis of third nerve

DR. KATHERINE CHAPMAN presented a boy sixteen years of age from the Northwestern University clinic. Vision was poor for distance, but good for near. Distant vision was R. E. 3/10; L. E. 5/10. There was marked ptosis of each upper lid, the palpebral fissure being R. E. 3 mm., L. E. 5 mm. When the frontalis muscle was used the fissure increased to R. E. 5 mm., L. E. 8 mm. The head was carried far back and rotated to the right when looking straight ahead. The patient could fix an object with both eyes for a short time only; he could adduct, but could hold this position for a short time only; depression was limited, and there was no elevation beyond fifteen degrees below the midline. Both eyes converged on attempting to look up. When looking to the right, the right eye fixed and the left eye was adducted for a few seconds, then diverged; when looking to the left, the left eye fixed and the right was adducted. On looking down, the right eye fixed and the left rotated outward. The pupils reacted normally. There was no history of specific infection; Wassermann negative. On refraction vision could be increased to 6/10 in each eye.

One sister had congenital strabismus. The mother had the same bilateral ptosis, but the right eye was better than the left. There was more marked rotary nystagmus when the eyes were turned to right and left. The sister was in a subnormal grade in school. Her vision was R. E. 6/10, L. E. normal.

DR. SANFORD GIFFORD had done a Machek operation on this boy on October 16th, and he could now open his eyes. It was not necessary for him to tilt his head, and his appearance was much improved.

Recurrent pterygium

DR. HARRY WOODRUFF presented a young man whom he had first seen in July, 1930, with a history of a growth in the right eye which started three years previously as a pterygium. There had been ten operations on this eye previous to Dr. Woodruff's, including a number of mucous grafts from the lip, but the growth recurred each time, and evidently did not come under the usual classification of pterygium. It was certainly not due to exposure to sand and dust; there was no history of traumatism.

In operating, Dr. Woodruff had tried to dissect the entire growth from the cornea, turning it in on itself all the way around and folding it over. The sutures gradually sloughed out and it was thought that the operation was successful, but the same condition had returned. It was an unusual case, and was shown for the purpose of obtaining some suggestions as to future care.

The boy had been seen originally by Dr. Haynes, then by Dr. Yerger, who had been asked to tell something of the operative procedures.

Discussion. DR. CHARLES YERGER said that Dr. Haynes had tested the refraction of this patient in 1928, and,

noticing the pterygium at that time, had suggested it should be removed. In August, 1928, this was done by the usual McReynold's operation. It appeared to be an ordinary pterygium, except that it was more vascular than usual. In February, 1929, it had recurred and had become larger and much more vascular, and another operation was performed. In June, 1929, when Dr. Haynes referred the boy to him, he did the same operation at Cook County Hospital. Again in December, 1929, it was removed, and when it returned in April, 1930, he decided to do a grafting. A piece of mucosa was removed from the lower lip, and after removal of the growth this was put in its place; two months later there was a recurrence, and the graft was repeated. Both grafts took well. Each time the operation was apparently successful for about six weeks, when the growth returned. It was possible that while the upper layers were destroyed there was some prolongation deep into the cornea. These prolongations recurred at irregular intervals and the normal cornea was undermined. There seemed to be regeneration, though considerable episcleral tissue was dissected at the last operation. However, about six weeks later the pterygium returned and the patient consulted Dr. Woodruff.

Dr. Ramon Castroviejo stated that he had seen a few similar cases, and also a few recurrences, until he saw Dr. Marquez of Madrid operate for pterygium. Dr. Marquez made two incisions, above and below, putting in a suture in the middle of the pterygium, dissecting from the base toward the apex, especially at the edges, and leaving the apex of the pterygium without dissection. Instead of cutting the suture the thread was pulled, taking with it the apex of the pterygium and surrounding epithelium, which included the zone of progression of the growth and thus avoided recurrence. This technique had been used in cases with recurrence.

Parinaud's conjunctivitis

Dr. Hallard Beard presented a man twenty-nine years of age, first seen on November 13. He stated that about a week earlier he had noted a lump on one side of his face near the ear. There was soreness extending to the eyelids and to the neck; there was some discharge from the left eye, but no pain and little soreness. He also complained of sore throat and a general feeling of illness. The glands of the neck were swollen and there was some fever. The eyelids were moderately edematous; he could scarcely open the eye. When the lids were everted the conjunctiva was found injected, thickened, the follicles enlarged, with an adherent mucopurulent material, but no definite area of inflammation or necrosis on the conjunctiva.

The possibility of trachoma was ruled out by the lack of characteristic local symptoms; no basis could be ascertained for a diagnosis of tularemia, as there had been no contact with animals. There was still the possibility of Parinaud's conjunctivitis. The only treatment so far had been application of silver nitrate to the conjunctiva and internal administration of iodides. This had had little effect, though the patient was no worse. The temperature had risen to 100 degrees each afternoon. The patient was shown with the idea of obtaining suggestions as to diagnosis and treatment.

Discussion. Dr. Sanford Gifford suggested that a sample of this patient's blood should be sent to Washington for agglutination with B. tularensis. He had never seen a case of tularemia, although several had been reported in the past few years. He had seen several cases of Parinaud's conjunctivitis, and the only difference was that in this case there were no grayish areas of ulceration, though something could be seen which might be ulceration. There might be a stage in Parinaud's conjunctivitis when the ulceration was not seen. Verhoeff had found thread-like organisms in these cases. He believed Parinaud's conjunctivitis included cases of tuberculosis of the conjunctiva, some of tularemia and some due to this thread-like organism, which had not been grown in culture. In one case he

had observed there was an eosinophilia of ten percent which subsided as the disease subsided. Less marked eosinophilia was seen in two other cases, and in a case reported by Gillett of Wichita.

Posttraumatic interstitial keratitis

Dr. Ramon Castroviejo cited the case of a patient who had suffered an acid burn to the eye. There was an abrasion of the epithelium of the cornea, which had since entirely disappeared. The pupils were sluggish. The pupils were dilated with atropin and the eye treated with local antiseptic ointments; there was considerable improvement for two weeks, when the eye suddenly became much inflamed. The cornea was infiltrated, and with the slit-lamp there could be seen a few vessels coming from the limbus toward the center, progressively increasing during the next few days. All laboratory analyses were negative.

Biscarsen injections were given every five days. The vision had decreased to light perception only, but after the third injection improvement was noted and after the eighth injection the infiltration of the cornea almost disappeared on the periphery, leaving only slight infiltration toward the center. The vessels had almost disappeared. Treatment was being continued, and vision was now fingers at two feet.

Lacarrère's double slit-lamp

Dr. Ramon Castroviejo presented a practical demonstration of this instrument, projecting some of the drawings from Lacarrère's book.

Symposium on etiology of uveitis

The subject was dealt with from the point of view of a dentist by Dr. Hugo Fisher, from the point of view of a genitourinary surgeon by Dr. Edward White, from the point of view of an internist by Dr. W. S. Lemon, Rochester, Minnesota.

Discussion. Dr. Earl Fowler thought the papers presented on this subject would aid considerably in passing judgment as to the etiology of cases of uveitis. In his relatively small series he had made interesting observations of comparatively obscure locations for foci of infection, especially in the upper respiratory tract.

Dr. Robert Von der Heydt congratulated the essayists on bringing out certain important points. To his mind these were: the latent perils in the toothless mouth, the possibility of a nongonorrheal etiology in a focal lesion of the urinary tract, and recurrences of attacks of uveitis because of a reactivation, even after cure of the focus of infection. He drew attention to the possibility of heredity as a factor in uveitis. Individuals might be born with lowered resistance and vulnerability of the uveal tract to inflammation. Especially might this be true in the third generation of syphilitics; the children of individuals having had parenchymatous keratitis were subject to attacks of cyclitis early in life.

Robert Von der Heydt,
Secretary.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

November 18, 1930

Dr. S. J. Beach presiding

Operation for paralytic squint

Dr. William Rowland said that within the last two years three American ophthalmologists of considerable experience had reported results obtained by operation on cases of paralytic squint. Details of the cases of Key, Gifford, and Peter were then cited. The author reported two cases.

Case 1: Miss G. E., aged twenty-two years, a stenographer, was referred in July, 1929, as to the possibility of obtaining cosmetic improvement for a very marked right bilateral deviation due to paralysis of the left external rectus and probable paresis of the right internal rectus. At the age of six years trauma to the head occurred twice. Some months after the second accident internal deviation of the left eye appeared along with a left facial paralysis. Treatment was not effective.

The examination revealed an internal deviation of the left eye of seventy degrees. The right eye turned out fifty degrees but could be brought just beyond the midline. The reciprocal innervation phenomenon of Sherrington as reported by Adler was not noted. The head was turned to the left. Vision O.D. was 20/100 improved to 20/30 by —1.50 sph. Vision O.S. was 5/200. In the right field there was an apparent attempt at binocular vision. On the left there was complete facial paralysis with lagophthalmos. Except for slight temporal pallor of the left disc there was no other ocular pathology.

On July 25, 1929, under local anesthesia, a Reese resection of six or eight mm. of muscle was done. The muscle lacked all normal tone and was atrophic. The conjunctival incisions were swung above and below, probably three mm. from the limbus, until the superior and inferior recti were uncovered. These muscles were freed along their external borders for about eight mm. and the outer third of each muscle separated by blunt dissection and held upon a hook. The suture from the external rectus was carried to each of these two muscles and woven through the outer third of each vertical muscle before it was severed at its tendinous insertion. These sutures were carried forward through the stump of the severed external rectus according to the procedure which Key had used in his case. Before these sutures were tied the internal rectus was uncovered and lengthened by the Todd zigzag tenotomy. The immediate result of the operation upon the muscles when sutures were tied was practically a straight-forward eye. At the same sitting, because of marked lagophthalmos and the wider palpebral fissure of the left eye, the outer five mm. of the fissure were closed by three mattress sutures, having first bared the intermarginal space. Healing was by first intention and the eye was still straight after three weeks. There was very little motion except up and down.

The right eye still remained in its marked outward position. It was felt at first that perhaps this eye had adopted this position in order to cooperate with the left, a habit or facultative adaptation, but finally it was concluded that there must have been at least a paresis of the internal rectus. In order to obtain a better position of the right eye, on September 5, 1929, under local anesthesia, the internal rectus of this eye was tucked five mm. with only slight improvement. The external rectus was then looked for to do a Todd zigzag tenotomy, but no external rectus could be identified. Instead an inferior oblique with an attachment as high as a normal external rectus was found. Thereupon the upper half or two-thirds of its tendinous attachment was severed. The result of this operation was a straight-forward eye. Healing was uneventful from these procedures and two weeks later a prescription was given for a —0.50 sph. right and a —7.00 sph. left, which gave 20/20 vision with the right eye and improved vision of the left to 5/100. The appearance of the patient's eyes through these unequal myopic lenses to the observer gave nearly equally large eyes, the left eye still showing some lagophthalmos although greatly improved by the partial closing of the palpebral orifice.

The right eye developed good rotation, the left very slight, during the period of observation. Later inspection, it was hoped, would demonstrate better rotation of the left eye. It was a question whether the right internal rectus fault had any relation to the head injury. Perhaps its function was limited by abnormal opponents.

Case 2: Mrs. S., aged twenty-eight years, was referred by the family physician in June, 1929, with a complaint of frontal headaches, dizziness, and indistinct vision. Without glasses, the vision of the right eye equalled 20/50 and Jaeger 1; of the left eye 20/50 and Jaeger 1, with difficulty. The left eye turned in about thirty prism diopters, and down about ten. The head was tilted to the right shoulder, the face turned left. Rotations of the right eye were normal; those of the left eye good up and down but outward rotations

scarcely beyond primary position. This condition had existed since early childhood without known etiology. In July, 1930, the supposedly paralyzed left external rectus was found to be a very good muscle. A Reese resection was performed, removing about six mm. of muscle, and tying these sutures after a tenotomy of the internus under control with a suture. The position being so good and there being slight outward rotation, and also because of the good external rectus muscle, the transplantation of recti was not done, the operator feeling that he was dealing with paresis and not paralysis. On November 7, 1930, the Maddox rod test indicated esophoria of eight diopters and left hypophoria of five diopters in distant vision and esophoria of five diopters and left hypophoria of three diopters at the near point. The operated eye rotated out 25° and in 30°. The head was held straight and there was complete freedom from headaches which had bothered the patient for a long time. There was quite good binocular vision and remarkably good depth perception, which was an unusual result and one not expected when the case was first studied.

In résumé, the author felt that the first case was one well suited to the transplantation of recti for additional help, while the second one must not have been a fully paralyzed muscle and therefore it was unnecessary to call upon help from the recti to secure a satisfactory result.

Study of interstitial keratitis

Dr. L. Maud Carvill presented a five years' later report on the study of interstitial keratitis originally presented before the ophthalmic section of the American Medical Association in 1925.

The study made by her and Dr. George S. Derby in 1925 was undertaken to determine as far as possible how much might be accomplished by antisyphilitic treatment of patients afflicted with interstitial keratitis. Their former report showed better visual results in the treated than in the untreated cases. Vision was 20/20 or better in 58 percent of the treated cases and 28 percent of the untreated. Vision was 20/60 or better in 75 percent of the treated as against 56 percent of the untreated. Vision was 20/70 or worse in 24 percent of the treated and in 42 percent of the untreated. Of the treated cases only 15 out of 178 had vision less than 20/100; one eye had light perception only. In the untreated cases 45 eyes out of 179 had vision less than 20/100; 5 eyes had light perception only, and in 5 eyes the vision was nil.

For this review in 1929 the authors were able to get a check-up examination on 67 of their 100 treated cases. In 23 cases the vision had improved; in 32 it had not changed; in 9 it was not as good; and in 3 these data were not available. In 5 of the 9 cases in which the vision had failed there were other complications.

Regarding the interval between attacks in the two eyes: In 93 cases, or 93 percent of the 100 treated cases previously reported, arsphenamin injections were begun early in the involvement of the primary eye with interstitial keratitis. Among these there were 18 (18 percent) in which the other eye showed no symptoms of interstitial keratitis. Of these 18 cases the authors had reexamined at this time 17; 16 (16 percent) showed no sign of interstitial keratitis in the second eye. The interval since the subsidence of active symptoms in the primary eye in these cases varied from five years to twelve. In none of these 67 cases which had been checked again had there been a recurrence of interstitial keratitis. It is significant to note that in our clinics the new cases of interstitial keratitis have fallen off from 0.5 percent of the new cases treated in 1914-1915 to 0.27 percent in 1929-1930.

Discussion. Dr. S. J. Beach wished to know if the intensive treatment in the earlier cases ever resulted in aggravating the inflammatory condition of the eye.

Dr. Carvill said she did not think that it did in any of their cases, although some became more inflamed after the treatment had been started, but she thought that the tendency of the con-

dition anyway was to develop to a certain height. There was no great reaction to the treatment. When the study was begun ten years ago there were nowhere near the number of intensive treatments. This naturally had some effect on the earlier statistics.

DR. ALLEN GREENWOOD was interested in the fact that a goodly percentage of these patients had not had an involvement of the other eye. It would seem that the treatment had had something to do with this fact.

DR. MCCABE said the thing that interested him particularly was the length of time within which the interstitial keratitis recurred. He had never happened to see a case which had recurred after five years and wondered if Dr. Carvill thought this interval unusual.

DR. CARVILL had seen very few cases which recurred after such a long period as that, and she stated that they called no case a recurrence unless the eye had been quiet for a year. Three and six-tenths percent of their 100 treated cases had recurrences within three years time.

Spicer had reported in 1924 that the number of cases in which the second eye had not been involved was two percent. In the 100 cases mentioned above which had intensive treatment the figure was 19 percent. As yet the second eye had not become involved in any of the 18 cases which they were studying. They ranged from five to twelve years.

Stereoscopic treatment of heterophoria

DR. DAVID W. WELLS said that one saw a hundred cases of heterophoria to one of squint. Just how often this condition called for treatment was a question about which there was much difference of opinion. For his own enlightenment, he studied one thousand consecutive cases of patients with eyestrain. He thought that 25 percent needed stereoscopic treatment. For various reasons only 15 percent were so handled. About 85 percent of those were cured of symptoms or much relieved. Probably some of those "cured" cases had had return of symptoms and had consulted other ophthalmologists.

In brief, his thesis was that heterophoria was frequently a cause of eyestrain, either alone or when associated with refractive error. It was best treated by cultivating a refinement of the fusion faculty and an amplitude of stereoscopic convergence. This treatment was indicated: (1) when the refractive error under cycloplegia was less than one diopter hyperopia or astigmia was less than 0.25 diopter; (2) in exophoria and convergence insufficiency; (3) in pseudo-esophoria; (4) when glasses failed to relieve.

Many ophthalmologists who claimed to believe in the virtue of stereoscopic training supplied the patient with a stereoscope and set of cards, and expected him to cure himself. This was not the author's method, and it was doubtful if it would accomplish much.

He then demonstrated his own technique, which was efficient and not too time-consuming for an intelligent handling of the case. He said he had yet to learn of anyone who had followed this routine who was not enthusiastic about the results.

The first essential was a phoro-optometer with two revolving prisms and a smooth mechanism for decentering the full-sized +10.00 D. spheres from 50 mm. to 70 mm. p.d. The card holder was fixed at 10 cm., thus putting the accommodation at rest. Each millimeter of decentration produced one prism degree just as definitely as the use of a separate prism in the clips.

Discussion. DR. W. B. LANCASTER said that he had the apparatus and had used it to some extent in his office but not enough to be counted an expert. He had used this method in studying his cases rather than for treatment of heterotropia.

Instead of training the patient not to suppress binocular vision he often, especially in severe cases, encouraged him to suppress it. If patients were trained to more perfect use of binocular vision their work was being added to because they had to do more perfect coordination. If he found a patient on the verge of suppressing he rather inclined to encourage him to go further

if he was suffering serious symptoms or was unable to do his work. To hold these patients to the extra need of perfect coordination seemed to him not so helpful as to show them how to get along with one eye, covering the other eye to eliminate binocular vision and the necessity of fusion and coordination. This was another way of looking at the problem.

There was this to be said in favor of Dr. Wells' thesis. One saw hundreds of patients with heterophoria who were having no trouble from it. This was doubtless because they were able to take care of the heterophoria by virtue of their excellent fusion powers. Dr. Wells did not claim to cure or eliminate the heterophoria in his cases but rather to develop amplitude of fusion so that the fusion powers were adequate. Dr. Lancaster believed that this was a rational way to go to work and Dr. Wells' results showed that it was effective. Dr. Lancaster meant to give it a more thorough trial in the milder cases, but in the severe cases he still felt that it was asking too much to burden these patients with the task of increasing their amplitude of fusion. It was like giving the tired blacksmith heavy dumb-bells to strengthen his arms. The point was that we could not treat them all alike and we should not get into ruts in doing our work.

Dr. W. H Lowell wished to know if Dr. Wells found that the patients were enthusiastic about this treatment and wished to keep on with it.

Dr. Wells had found that the patients became interested in the treatment and in helping themselves. If a patient did not appear to want to keep up the treatment Dr. Wells told him that if he did not want to help himself he should stop the treatment.

Dr. Greenwood asked how severe must the symptoms be to warrant suggesting this treatment.

Dr. Wells answered that this was when proper correction of the patient's refraction left him with uncomfortable symptoms suggestive of eyestrain, a sense of confusion, a sense of not being able to apply himself to his reading or study, and complaining of an indefinite headache—not frontal, not occipital, but all over. The word "confusion" in this case was explanatory. He did not treat patients who had no symptoms. He told them that here was a condition that might need further treatment and that when it did he had something more in the way of treatment to offer them.

Dr. Lancaster asked if the suppression was not nature's way of getting around the difficulty, and if so, did not Dr. Wells approve of following that way.

Dr. Albert E. Cross wished to know how late in life this treatment could be started. One patient, a wealthy manufacturer, who had been under treatment elsewhere for a great many years, was wearing a five degree prism base in and up. He had exophoria of about twenty and hyperphoria of five prism diopters. For years this man had made a practice of carrying in his pocket a wad of cotton which he would put before one eye when he wished to read. He could not fuse the bird cage and bird pictures and it was two months before he learned to do so. After a period of five months this man could fuse any card in the Wells list.

Dr. Wells remarked that many patients were comfortable in using their eyes in a way that was not natural. The ideal condition was the constant use of both eyes stereoscopically and he felt that it was his duty to establish that state if possible. Dr. Lancaster's allowing fusion to be disregarded was of course one method of treatment. Dr. Wells had had several patients who had rebelled against that method and had been taught fusion. He did not know what the age limit was in treatment of this kind. He had treated patients sixty-five years of age successfully. But he would say that ordinarily at fifty-five to sixty years of age, when a patient was suffering from convergence insufficiency, the best plan was for him to use prisms in his reading glasses.

S. J. Beach,
Secretary.

BALTIMORE CITY MEDICAL SOCIETY

Section on Ophthalmology

December 4, 1930

Dr. Angus L. McLean, president

Perforating injury of eye

Dr. Heidelman presented a patient, aged three years, who was admitted to the Wilmer Institute, November 7, 1930, with a history of having been struck in the right eye by an arrow shortly before.

Examination of the right eye showed moderate conjunctivitis and circumcorneal reaction, with a perforating injury of the cornea about 1 mm. from the limbus at the five o'clock position. The pupil was pear-shaped, the iris at the apex being incarcerated in the wound. The anterior chamber was of normal depth. A small hyphema was present. The vitreous was clear and no fundus lesion was seen. Hot compresses and instillations of pilocarpin were ordered, the latter with the intention of drawing the iris from the wound.

The following day the circumcorneal reaction was quite marked and the lids were swollen. There was also some exudate on the anterior capsule of the lens. The hyphema was very much reduced in size. In four days a white mass obstructing the view of fundus was seen in the vitreous. This now appeared to be encapsulated and over it pink streaks were seen. These were either blood vessels or hemorrhages. A diagnosis of pseudoglioma was made.

Gun-shot injury of one eye; possible concussion hemorrhage of other eye

Dr. Rones presented a nineteen-year-old patient who on September 16, 1930, while gunning, was shot in right shoulder, right side of head, and right eye, after which he was unable to see with this eye. In six days he claimed he could see objects. The physician by whom he was being treated gave no hope for vision in this eye and he entered the Wilmer Institute November 12, 1930. Points in the past history were that the patient had been in an automobile accident four years previously and had received a concussion of the brain, after which he had at first noticed a diplopia which cleared up after a time. No history of injury to the left eye was elicited.

Examination of O. D.: Vision was limited to light perception and poor projection. In the sclera several mm. posterior to the temporal margin of the cornea was a scar, presumably the point of entrance of a shot. The cornea was clear, the pupils round and sluggishly active. The lens appeared clear. Ophthalmoscopically a pink reflex only was to be seen, due apparently to a large hemorrhage in the vitreous.

Examination of O. S.: Corrected vision was 20/40. External examination was negative. Ophthalmoscopically, the picture was that of massive retinal hemorrhage with proliferating retinitis in the lower nasal quadrant of the fundus. The vitreous was somewhat cloudy and the outline of the nerve was nearly obliterated.

X-ray examination revealed no shot in the right eye or in the surrounding tissues, but there was what appeared to be a shot just back of the left eye. No explanation could be found for the presence of the foreign body posterior to the left eye.

Discussion. Dr. Alan Woods suggested the possible etiology of the condition found in the left eye as comparable to many cases of concussion hemorrhage seen during the World War. These patients, while not showing external evidence of injury, did show on fundus examination massive subhyaloid hemorrhages, with subsequent connective tissue and glial tissue changes. These conditions were the result of high speed projectiles passing close to, but not touching, the eye.

Perforating injury of eyeball

Dr. Little showed a patient, aged twenty-six years, who stated that on November 12, 1930, while pounding a piece of metal with a hammer he felt something strike his right eye. Examination revealed a perforating injury near the limbus at about the 6:30 o'clock position. Previous to admission

to the Wilmer Institute an unsuccessful attempt at removal with the magnet by the anterior route had been made. Family and past history were irrelevant. Examination showed the anterior chamber to be of normal depth and the cornea clear. The pupil was pear-shaped, the apex being at the point of perforation where the iris was drawn into the wound; and it reacted, except where incarcerated. The lens was clear, Ophthalmoscopically a linear hemorrhage of the retina was seen to extend from the periphery of the fundus, nearest the perforation, to a point near the macula where there was a small white area, the apparent point of exit of a foreign body. There was moderate reaction. X-ray revealed a foreign body 20 mm. behind and 5 mm. above the center of the cornea, which would place it in, or just posterior to, the sclera. Vision in the right eye was 20/30; the left eye was amblyopic. Blood chemistry was negative and uveal pigment test was negative.

Treatment: Inasmuch as the foreign body was in or behind the sclera it was thought advisable to make no further attempt at removal. On the second day there was very little reaction and no outward symptoms.

Discussion. Dr. C. A. Clapp was of the opinion that the foreign body, being in or behind the sclera, would probably cause no further damage. If, however, the foreign body was steel and happened to be in the choroid, siderosis would probably result.

Case of pemphigus

Dr. Paton presented a woman aged 43 years who was admitted to the Wilmer Institute December 3, 1930. The family and past history were irrelevant. The present illness started five years ago with soreness and photophobia of the right eye. This improved on treatment, with no resulting visual impairment. Eighteen months later there was a similar attack with some discharge along with the pain and photophobia. The condition had gradually become worse until the present time, when the left eye was involved in much the same manner. Points of importance in the general examination were a dry skin and some desquamation of epithelium on the plantar surfaces of the feet. Examination of the pharynx revealed a pustular lesion on the posterior wall from which was obtained the bacillus Vincenti.

External examination of the eyes showed ecchymosis of skin of the lids with a scaly dermatitis. The palpebral and ocular conjunctivæ were edematous and injected, with a suggestion of bleb formation, and bled easily on slight excoriation. There was also moderate contraction of the conjunctiva of the conjunctival sacs and a small amount of whitish discharge. The cornea of the right eye was semiopaque, with superficial and deep vascularization. The iris of the right eye showed large synechiæ at the three and eight o'clock positions and was somewhat atrophic. There was some exudate on the anterior lens capsule. The iris and pupil of the left eye were normal. There was a nebula near the center of the cornea. Ophthalmoscopic examination O.D.: Fundus not made out. O.S.: No lesion seen. Slit-lamp showed aqueous flare to be increased.

Cultures from the conjunctival sacs showed a few diplococci. Smear showed also a few pus cells. The basal metabolic rate was —15. X-ray of chest was clear. Blood sugar was 120 mg. per 100 c.c. of blood. The Wassermann was negative. There was a marked sensitivity to 1 to 1,000 mg. tuberculin.

Discussion. Dr. Burky reported that cultures which he had taken from several of these cases had shown an anaërobic diplococcus, and had a rather characteristic foul odor.

Dr. C. A. Clapp reported that in his experience the age range was very wide. He had seen cases at from six to seventy years of age; the majority of the cases however occurred in late middle life, from fifty to sixty years. The etiology was unknown, anaërobic blood infection having been suggested. Pemphigus of the eye was occasionally seen in cases of general pemphigus and there were usually associated lesions in the

throat. Treatment in his cases had been of no avail with one possible exception in which an early case was apparently cured by radium exposures.

Dr. Joseph Kemler had known of two patients with ocular pemphigus who died of general pemphigus.

Chorioretinitis juxtapapillaris or Jensen's disease

Dr. Rowland showed a seventeen-year-old patient who was seen at the Wilmer Institute, giving a history of having noticed spots before the eyes for the past three weeks. Other history and family history were irrelevant.

External examination of each eye was negative except that the pupils were dilated, homatropin having been previously instilled. Vision O.D. was 20/40, O.S. 20/20—. Ophthalmoscopic examination of the right eye showed numerous fibrinlike opacities of the vitreous with an area of choroidal exudate about 1.5 disc diameters, located below and in direct contiguity with the nerve head. There was also a small area of exudate in the macular region. The left eye was normal. A scotoma which included the area corresponding to the lesion and the normal blind spot was found. Examination for possible foci of infection revealed infected ethmoid cells. These were drained. The patient was also sensitive to 1/100 mg. tuberculin and was receiving tuberculin treatment.

Discussion. Dr. Rones brought up the question whether or not chorioretinitis, in which the lesion was not contiguous with but very near the nerve-head, was so-called Jensen's disease.

Dr. Alan Woods was of the opinion that this was a case of true Jensen's disease.

Dr. Jonas Friedenwald thought that if the scotoma produced by the lesion was contiguous with the normal blind spot the case was one of true chorioretinitis juxtapapillaris or Jensen's disease.

Rôle played by staphylococcus in eye conditions

Dr. Earl Burky of the Wilmer Institute read a paper which was in the nature of a progress report.

The work done consisted in taking cultures from conjunctivæ to determine either the cause of an existing infection or the presence of any bacteria which might be dangerous if introduced into the eye at operation.

Experimentation on the various methods of taking cultures seemed to show that cultures collected with a dry swab and incubated twenty-four hours in blood broth yielded a greater number and variety of organisms than did cultures taken by the other usual methods.

In addition to the usual broth tube inoculations, anaërobic rabbit-blood hormone broth tubes were planted, resulting in the recovery of pneumococci, green and hemolytic streptococci, and Pfeiffer or Koch-Weeks bacilli, when the aërobic cultures had shown only staphylococci and diphtheroids. In addition, by this method Dr. Burky had recovered anaërobic bacteria which to his knowledge had never been reporte as being present in the conjunctiva.

All of the normal cases cultured by this method showed staphylococcus albus. About 50 percent showed also diphtheroids of the usual type. Occasionally other organisms had been encountered, but each one so rarely that it was thought safe to dismiss them as unessential. No anaërobes were recovered from this group. The pathological cases included only styes, chronic blepharitis, and conjunctivitis. Cases of stye had shown staphylococci only. The dry, itching, burning type of blepharitis and conjunctivitis had shown staphylococci predominating, with occasionally a few colonies of diphtheroids. The watery type usually showed a predominance of diphtheroids. In this group about 75 percent had shown staphylococci only. Of the remaining 25 percent, occasional cases had shown diphtheroids only. In the others, associated with staphylococci there had been found green and hemolytic streptococci, Koch-Weeks bacilli, and anaërobes.

Since the most common cause of

chronic conjunctivitis, as indicated by this work, was the staphylococcus, which was also present in the normal conjunctiva, the problem that presented itself was whether the staphylococci found in normal eyes could be distinguished from those in infected conjunctivæ and, if they differed, to what was the pathogenic action of certain strains due. It was found that normal eyes showed no pigment-producing strains, while numerous pathogenic cases showed pure albus strains.

Certain strains grown under optimum conditions produced a true exotoxin. This toxin when injected into animals produced an antitoxin which neutralized its effects. When the toxin was treated with formalin, an anatoxin was produced which was capable of producing antitoxin, although the formalin had destroyed its toxic effects. Given intradermally the toxin produced erythema and swelling. Intravenously it killed in one to twenty-four hours. Its effects could be neutralized by antitoxin. Cultures grown anaërobically produced no toxin. The ability to produce toxin seemed to offer the most satisfactory approach to the problem of differentiating harmless and pathogenic staphylococci.

Three strains were used in human and animal experimentation; one from a case of chronic blepharitis and conjunctivitis, one from a stye, and a third from a normal eye. The blepharitis strain produced the most toxin as measured by the skin test. Next in order came the stye strain and then the normal strain. In the normal cases there was no immediate reaction but there was a delayed one. In many of the pathologic cases there was an immediate reaction of the pollen type which faded in from two to four hours, and a delayed reaction much more marked than in the normal cases.

These results suggested the presence of a definite toxin in the broth filtrates of staphylococcus cultures from infected conjunctivæ. Associated with this toxic principle there was an increased sensitivity to the toxin in chronically inflamed conjunctivæ.

An attempt to verify experimentally the hypothesis of hypersensitivity suggested by the results in humans was made.

Staphylococci instilled into a rabbit's eye, the cornea of which had been slightly scratched, produced an inflammation of the conjunctiva lasting only twenty-four to forty-eight hours, or none at all. However, if the rabbit had been sensitized, there developed around the traumatized area a cloudiness of the cornea which cleared in about one week. There was also a moderate amount of conjunctivitis which persisted indefinitely. If a rabbit was treated by suitable injection of these toxins he became resistant and no infection followed such experimental infection. These results suggested that hypersensitivity played a rôle in conjunctivitis. A few cases had been treated with vaccines, well fortified with toxin, and, so far as was known, only one had not shown definite improvement.

Discussion. Dr. J. H. Brown thought that the results of this work offered good possibilities in treatment. He desired to know whether leaving the dry swab culture in the blood broth less than twenty-four hours would not be sufficient; also, if patients showing styes or conjunctivitis showed any other infection such as coryza or furuncles and was the same organism isolated from both conditions.

Dr. Alan Woods desired to know if a patient developed the same skin reaction when an autogenous vaccine was injected as when one of the three vaccines used in the experimental work was injected.

Dr. Burky replied that it was best to allow the swab to remain in the blood broth for twenty-four hours. Answering the second question he said that in several patients having conjunctivitis or styes there was an associated coryza or other local infection from which the same strain of organism was often recovered. In reply to Dr. Wood's question Dr. Burky said that in cases in which it was possible to compare the autogenous and stock vaccines on the patient the same reaction was obtained.

Retinal changes in arteriosclerosis and hypertension

Dr. Jonas Friedenwald's paper on this subject was a report of unfinished work, the final part of which was to be more or less of a sequel to a paper previously published on the clinical classification of this condition.

It was essentially a correlation of the clinical and pathological findings, being illustrated by lantern slides of fundus drawings and photographs and of microscopically prepared sections.

The article on the clinical classification was in the Johns Hopkins Hospital Bulletin, volume 45, November 4, 1929, page 232, and the results of this work would be contained in "The kidney symposium of the University of Minnesota," to be published by Paul Hoeber.

Henry F. Graff,
Secretary.

KANSAS CITY SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

November 20, 1930

Robert W. Forgrave presiding

Bilateral detachment of retina

Dr. J. W. McKee reported a case which occurred during pregnancy and was followed by spontaneous recovery. Dr. McKee said the prognosis was better in this class of cases. These cases were rather uncommon although not rare.

The case reported occurred in a white woman, thirty years old, six months pregnant, who complained of smoky vision two weeks before calling the doctor. This changed to colored vision which became increasingly worse. The patient's face was edematous and the pupils were dilated and were sluggish in reaction. Vision in each eye was limited to large objects. Abortion was performed, and two days later there was a large retinal detachment in each eye. No hemorrhages or exudate could be seen and the vision fell to hand movements. The patient was put to bed, and in two months vision became 20/30 and 20/20 with only slight scotomata.

External rectus paralysis

Dr. Morris Clark read a paper on this subject, with case reports.

Discussion. Dr. Alvin J. Baer said that the occasional alternating divergent squint seen in myopia or even with emmetropia was probably due to a lack of development of the fusion center. He also stated that one of the earliest signs of multiple sclerosis was often paresis of the sixth nerve, and that this disease must be constantly borne in mind in dealing with a divergence.

Dr. Lyle Powell (Lawrence, Kansas) mentioned paresis of the sixth nerve as an early concomitant of cavernous sinus thrombosis.

Dr. J. W. McKee stated that divergent squint was a common finding in acute anterior poliomyelitis.

Dr. A. N. Lemoine mentioned the frequency of divergence in hyperthyroid conditions.

Dr. E. E. Pickens said that a divergence was not rare following mastoiditis and often was a temporary complication.

Dr. Morris Clark, closing, stated that sixth nerve paralysis combined with a central scotoma was very characteristic of multiple sclerosis. He also said that whether these paralyses of the abducens, occurring in cavernous sinus thrombosis, were due to a toxemia or not was a moot question. The paresis occurring in connection with mastoiditis was due either to a toxemia or to a spread of the inflammatory process by way of the meninges and might occur with brain abscess.

Alvin J. Baer,
Recorder.

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GONIN'S OPERATION FOR DETACHED RETINA

Whatever may be the final judgment on Gonin's operation, it has brought hope to the profession, an attitude from which more good can be expected than from the pessimism that followed the failure of other operations to secure reattachment.

The importance of ruptures or tears in the retina has been urged since Leber called attention to them; but never in quite the same way or with such a basis of reason.

At the Oxford Congress of 1930 Gonin made the following statements: "In more than ninety-five percent of the cases, whenever ophthalmoscopic examination is possible, one or several holes may be detected in the retina if looked for with sufficient care." "In all recent cases, when the hole or tear has been closed cure is immediate, complete, and permanent." "If the detachment relapses, it is found that the tear has not been completely closed, or that there was another tear which had not been previously seen. A recurrence of detachment in a different region of the eye is due to formation of a new hole in the retina." More numerous and longer trials of the operation are required before its full value can be developed, or the permanence of its cures established. But the thought it has provoked can be turned in new directions and may bring nearer the understanding and solution of an old and most difficult problem.

The amount of nutritive fluid to be constantly supplied from the blood to sustain the very active function of the retina has not been closely estimated, but it must be large. The first impairment of function that results from detachment seems to depend on interference with this nutritive supply. But the retina can be detached for a long time and not wholly lose its sensitivity to light, or the possibility of partial restoration of function and useful vision.

The nutrition of the retina depends on two sources of blood supply, the capillary layer of the choroid for the

outer layers of the retina, and the branches of the central retinal vessels for the inner layers. Probably displacement of the retina first impairs its function by removing the layer of rods and cones and the outer nuclear layer from their normal source of supply. Prompt replacement may restore their function, but prolonged impairment of nutrition may render this impossible.

At the International Congress at Amsterdam four papers on detachment of the retina and the remarks of nine participants in the discussion of them were all centered on the Gonin method of treatment, and the reasoning on which it is based. At the Heidelberg Congress last June Lindner read a paper on the technique he now employs for the Gonin method, and this was discussed by fifteen of the most prominent German ophthalmologists. Kapuscinski would make a distinction between myopic and senile detachment, but he formed his distinct groups of twenty-four senile and eighteen myopic cases by omitting the cases that were both senile and myopic, and he admitted later that in older detachments the two cases were more alike. Gonin found that the majority of cases were both senile and myopic. It does not seem necessary to consider their etiology and treatment as essentially different. In these papers and discussions those who report the best results attach most importance to finding the tears in the retina and closing them early with the cautery. The estimates of permanent success in cases thus treated vary from twenty to ninety percent, which is better than has been attained or claimed for other methods.

In his Oxford address Gonin alluded, a little sarcastically, to the delay of English-speaking ophthalmologists in knowing and using his operation. He should remember that English-speaking people are usually practical in their inclination. We were not greatly interested in the scientific observations of Leber as to retinal tears, and the earlier theoretic advances of those who accepted Leber's views. Now that Gonin has demonstrated the practical importance of a real understanding of the pathology of retinal detachment he will find some of his best supporters among Englishmen and their American cousins. In an article upon ignipuncture in detachment of the retina, in the last April number of the American Journal of Ophthalmology, page 304, the author (whom Gonin calls "Mr." Gradle) offered the kind of support that the method needed, before it had found such support at the Amsterdam, the Heidelberg, or the Oxford Congress. It may interest Gonin to know that his earlier but less conclusive communications had been noticed in the Ophthalmic Year Book, 1905, page 128; 1916, page 161; 1917, page 254; 1918, page 358; 1921, page 254; 1924, page 245; and 1925, page 164. These were all careful and rather full accounts of Gonin's views, most of them prepared by the late Dr. Feingold. In the American Journal of Ophthalmology they have been noticed in volume 3, page 57; volume 11, page 85; volume 12, page 438; and volume 13, page 843. Thus, if Gonin had addressed an American congress or society of ophthalmologists they would probably have shown themselves not unfamiliar with the importance of his views.

Confused and false ideas regarding the nature of retinal detachment have been introduced by mistaken assumptions and loose expressions used in writing and speaking about it. Graefe assumed that the retina was pushed away from the choroid by fluid poured out from the vascular coat. This idea is perpetuated by such expressions as "subretinal space", "subretinal fluid", and "separation of the retina from the choroid".

It is now generally understood by anatomists and pathologists that the infolding of the optic vesicle to form the optic cup brings together two embryonically independent thicknesses of retina; and that the outer develops into the pigment epithelium of the retina while the inner forms the layer of rods and cones and the granular and conducting layers. The choroid is limited by Bruch's membrane, a glassy mem-

brane probably developed from the retinal epithelium and strictly a part of the retina. But in so-called detachment of the retina the separation never occurs at Bruch's membrane. This and the pigment epithelium of the retina remain attached to the choroid, and the percipient and nerve layers separate from the pigment epithelium.

Normally the nutritive supply of the rods and cones and of the external nuclear layer filters through Bruch's membrane. Fluid coming from the vitreous body through a tear in the retina may be normal for the inner retinal layers, the nerve fibers, the ganglion cells, and the inner nutrient layer. But it has never filtered through Bruch's membrane as had the normal nutritive supply of the rods and cones. Bruch's membrane is an effective barrier to many pathological processes. We may reasonably suppose that it is also a barrier to substances that have passed from the blood serum to form the nutritive supply of the choroid, but which would impair the function of the retinal pigment epithelium and the rods and cones. The separation called retinal detachment is always between the epithelium and the rods and cones. The entrance of fluid from the vitreous into this space impairs the function of the retina, which is unable to present effectual resistance so long as its portal of entrance remains open.

It may well be that closure of the tear or hole in the retina by cauterization is the essential and most effective treatment for retinal detachment. The adhesion of the rods and cones to the pigment epithelium is a necessary condition to the normal performance of their function. The abnormal opening being closed, the inner layers of the retina are able to prevent the vitreous fluid from penetrating to the outer layers. The exposition here given of the mechanism of retinal detachment is rather long and may seem superfluous. But it is necessary in order to neutralize some misconceptions and false explanations which may tend to prevent a fair hearing of Gonin's views and a fair trial of his method of treatment.

Edward Jackson.

WHAT IS GLAUCOMA?

Glaucoma may be defined as a disease process whose most constant feature is an increase of intraocular tension. If we accept that definition it commits us to the idea that increase of tension is only one of several or many factors, and that it alone is not glaucoma.

Speaking of glaucoma simplex, because it involves fewer apparent changes than the congestive type, one is frequently confronted with the problem of whether or not to make a diagnosis of glaucoma on increased tension alone. Traquair says that if no field defect is found in the area around the blind spot, especially about the line of the fifteen-degree circle, toward the vertical meridian, glaucoma does not exist. He thus gives these early field defects more diagnostic value than hypertension and more, of course, than the visible changes in the nerve head, which really occur quite late. If we depend on tonometry we must remember that it is not an exact thing, there being many sources of small error, so that one hesitates to attach great significance to an elevation of tension to thirty millimeters (Schiøtz), even when repeated tests indicate that the measurement is probably exact. Just as with vascular pressure, there is a range which may be considered normal, and which may vary in different persons. It seems likely too that just as some people can "carry" an increased blood pressure for a long time without any apparent inconvenience or damage, so some eyes can tolerate an increase of intraocular pressure for a long time without damage. Intraocular hypertension secondary to a recognizable although not necessarily obvious condition has a different significance from the so-called primary affection.

This particular question was the subject of a very interesting discussion at the last meeting of the American Ophthalmological Society. Cases were mentioned in which the tension did not rise above twenty-five millimeters (Schiøtz), but which showed in time all the other signs of glaucoma. In such

cases a study of the light sense, especially of the light minimum, is very helpful, though its value is limited because no satisfactory office equipment for the test is available. It is hard to see how cases with low tension admit of early diagnosis, but it would seem that patients whose tension is persistently around thirty millimeters (Schiøtz) would best be considered as at least potential victims of glaucoma and treated accordingly.

If there is one point about glaucoma upon which there is no difference of opinion, it is that successful management depends on early recognition and treatment. We should, therefore, be alert for the early signs of glaucoma, even more than for the cupped disc and the contracted field; and of all the means for detecting the disease in its early stages there is none so satisfactory or so generally available as tonometry, with due allowance for its inaccuracies and limitations.

Edward C. Ellett.

ALLERGY IN OPHTHALMOLOGY

At the annual meeting of the Texas Ophthalmological and Otolaryngological Society held in Houston in December, all of the essayists on the rhinological half of the program selected the subjects of their papers independently and all decided to deal with allergy. This is only one of many indications of the importance now being assigned to this subject in medicine.

Thirty years ago rhinologists were content to swab noses and take out tonsils and adenoids. Ten years later the great value of certain operations was demonstrated by such men as Sluder and before long the pendulum swung too far to the operative side. Now with increasing knowledge of allergy the pendulum has swung back, perhaps too far again. Certain it is, however, that many ill-advised operations were performed on allergic noses, much to the detriment of the patient and to the discredit of science.

Though allergy does not apparently play so important a rôle in ophthalmologic as in nasal pathology, it is not to be denied that many inflammations of the conjunctiva are manifestations of allergy and will yield most readily to treatment based upon recognition of this fact.

The clinical picture in the conjunctiva is fairly typical, being characterized by edema and itching, a thin mucoid secretion, and eosinophilia. Frequently a carefully taken history will reveal the cause of the trouble. This point cannot be overstressed, as there is no disease in which the history is more likely to disclose the cause and hence to give the clue to effectual therapy.

If the difficulty occurs in children a food allergy must especially be considered, while actual contact with offending substances is more important in the adult. Skin tests, if very accurately made and intelligently interpreted, may have a double value, first in determining whether or not the patient is allergic, and second by indicating the particular substance responsible for the difficulty. The trouble here lies in the multiplicity of possible offending agents; in the probable sensibility of the individual to more than one substance; and in the variability of the patient's reaction as far as it depends on his general condition. When resistance is lowered as by an acute infection, he becomes sensitive to things which do not disturb him when he is in good health. Skin tests, to be of value, must be carried out by a physician thoroughly conversant with their technique and reactions.

If for one reason or another the skin reactions cannot be tested and the most painstaking history and mature deliberation by the patient on the subject are fruitless, deprivation food tests may be made. One restricted diet after another should be tried, each for several days. Any systematic method of deletion of foods from the diet may be used, but to give concrete suggestions is of doubtful value as each geographical region seems to have its special group of common offenders. The method obviously consists in noting what factors

are omitted in periods that have shown a relief from symptoms. A great variety of substances has been found responsible. Especially frequent factors in children with vernal conjunctivitis, which is in most cases an allergic disease, are eggs, milk, chocolate, and certain cereals, while in adults contact with feathers, washing soap powders, face powders, pollens, and ointments have proved important.

The contact type is frequently unilateral, while the food type is practically always bilateral.

The treatment is obviously withdrawal of the offending agent or agents and local application of soothing lotions. Dust and wind are especially irritating, so protective goggles are of real value.

Although not extremely numerous these cases occur with sufficient frequency to demand that they be considered in all inflammations of the conjunctiva which are not manifestly due to bacterial infection.

Lawrence T. Post.

BOOK NOTICES

Thirteenth International Congress, 1929, Holland. Four volumes, cloth, 2256 pages, illustrated. Published for the Congress. Amsterdam, 1930.

The Thirteenth Ophthalmological Congress, held in Holland, a small country with wide commercial relations and surrounded by countries all speaking different languages, may well be excused for going back to Latin for its official title. This account of the meeting in September, 1929, is sent out to the members who have subscribed for it. Other thousands of ophthalmologists throughout the world will wish that they had it. After deductions for what is printed in each of the five different languages, there remain two thousand pages containing about as much new matter as two volumes of this Journal, or three times as much as the transactions of the Washington Congress, 1922, or the 1925 Convention in London.

That it was a greater congress than any of its predecessors becomes very evident as we study its transactions. They give the best reflection of present thought regarding ophthalmology. The 233 communications presented to it came from 217 authors, representing thirty-one different countries of the world; and still more countries were represented in the discussions. There are plates in colors and reproduced photographs, with illustrations in the text running into hundreds. Probably from the Transactions more is to be gathered than it was possible for any one person to gather by attendance at the Congress. There were sections meeting simultaneously on five days, each presided over by men of world-wide fame. The Congress opened Thursday. Friday, for the morning meeting given to demonstrations, E. Treacher Collins, of London, was president. For the symposium on "etiology and medical treatment of glaucoma", Friday afternoon, R. Onfray, of Paris, presided. On Saturday sections going on simultaneously were presided over, in the morning by Meller of Vienna, by Avizonis of Kaunas, Lithuania, and by Selenowsky of Leningrad; and in the afternoon by Imre of Budapest, by Ismet of Istanbul (Constantinople), and by Pascheff of Sofia, Bulgaria.

Monday morning was given to twenty-five reports and papers and discussions, by nineteen speakers, on the "geographic distribution and international struggle against trachoma," Krückmann of Berlin presiding. Monday afternoon there were sections presided over by Coppez of Brussels, Byers of Montreal, Weve of Utrecht, and Cosmettatos of Athens. Tuesday morning there were sections presided over by Grönholm of Helsingfors and Dereani of Jugoslavia; and in the afternoon by Schiøtz of Oslo, by Zeeman of Amsterdam, by Weve of Utrecht, and by Manolescu of Bucharest. Thursday morning, "Communications", Szymanski of Wilno presided; and in the afternoon Parker of Detroit, for the symposium on "suprasellar tumors". Friday morning was again

given to papers on cataract and so on, with Pflüger of Berne presiding.

The labor of getting all these communications, in five different languages, correctly printed, within sixteen months after the close of the Congress, has been enormous. The editor-in-chief, F. Wibaut of Amsterdam, is to be congratulated; both as to the completion of the work and as to the excellent manner in which it has been done. But some of the difficulties that were insurmountable appear in these volumes. It would have added to the accessibility of their contents to have had a single system of paging, running through all the volumes, instead of the separate paging that has been adopted in volumes 3 and 4. If alphabetical indexes for names and for topics including all the volumes, or even one detailed table of contents for the whole series were published, it would help the readers who wish to refer to special subjects. It would make this one of the most valuable reference works to be found in the whole literature of ophthalmology. One must have considerable acquaintance with it to be fully in touch with the scientific advances of the past decade.

Volume 1 opens with lists of official delegates from twenty-five countries, and from thirteen societies and universities. Then come the proceedings of the opening session, Thursday September 5, 1929, including the address of President Von der Hoeve, given in Dutch, English, French, German, Italian, Spanish; announcement of the opening by Her Majesty, the Queen Mother, in Dutch and French; and the responses in their different languages by Parsons of London, Terrien of Paris, Krückmann of Berlin, Lodato of Palermo, Marquez of Madrid, Dalen of Stockholm, Wilmer of Baltimore, Demaria of Buenos Aires, Nakashima of Japan, Hamdy el Maziny Bey of Cairo, Lutrario of Geneva, de Ruyter from the Dutch Indies, and Schoute of Amsterdam. Then come the scientific proceedings of the demonstration and other sections and general meetings, with papers and discussions. It is to be noted that among the demonstrations are five relating to the diagnosis and treatment of defects of ocular movement and four relating to the field of vision; and that fatigue-testing, photography of the fundus, red-free light, pathology, operative instruments, and other apparatus come in for their share of attention.

Volume 2 includes the balance of the voluntary papers presented in the sections, with the discussions they elicited. It also includes the proceedings of the business session of the Congress and of the meeting at Scheveningen, the history of the organization of the Congress, the rules of the Congress, its officers and committees, and the list of its members. Among its many illustrations, it contains pages of stereoscopic views of the ocular fundus and color plates of detachment of the retina.

Volume 3 contains the important papers given in the three formal symposia of the Congress; on trachoma, 26 papers; on glaucoma, 4 papers; and suprasellar tumors, 4 papers. (Other papers on trachoma and glaucoma are to be found in other volumes.) With this volume is a map showing the distribution of trachoma throughout the world. This volume of 628 pages is given entirely to scientific proceedings, illustrated by maps, diagrams, fields of vision, microscopic slides, and photographs of patients.

Volume 4, the largest of the series, 770 pages, brings out the greatness to which the International Congress of Ophthalmology has developed. It includes the reports of commissions, previously designated to study for the Congress certain subjects of international importance and interest. The names of the authors of these reports emphasize their importance and representative character. The standardization of visual acuity is presented by Dufour of Nancy and Elschnig of Prague, the standardization of perimetry by Lauber of Vienna, Traquair of Edinburgh, and Peter of Philadelphia; uniform notation of meridians of astigmatism by Nordenson of Upsala and Marquez of Madrid; the light sense by

Hertel of Leipsic and Ovio of Italy; the unification of visual requirements for aviators, chauffeurs, railway employees, and sailors by Engelking of Freiburg, McMullen of London, Onfray of Paris, and Verrey of Lausanne; the program of ophthalmologic teaching for doctors in general and for future ophthalmologists, for Continental Europe by Lindner of Vienna, and for the British Empire and America by Parker of Detroit.

Then, after a brief preface on the development of ophthalmology and of its international congress, come lists of the ophthalmologists of the world, their names and residences. Those of the United States occupy 105 pages, those of Great Britain 14 pages, and the whole list 264 pages. Lists of periodical publications relating to ophthalmology occupy twelve pages; giving for each the name, place, and period of publication and the names of editors. The lists of ophthalmological societies take four pages, and those of ophthalmic hospitals and of institutions for the blind occupy 73 pages.

Probably only the completion of this great work brought, even to those who were working on it, an understanding of its immense importance. If its broad scope and value could have been fully announced before, the copies demanded would have been numbered by thousands. Every public medical library in the world should have it. Of the 938 members of the congress, 146 were from the United States, and 51 from other parts of the American continent. *Edward Jackson.*

American Ophthalmological Society, Transactions, volume 28, 1930. Octavo, cloth, 374 pages, 37 plates, 3 in colors; 23 illustrations in the text. Published by the Society, Philadelphia, 1930.

This volume records the proceedings of the sixty-sixth annual meeting. Among societies devoted to the different specialties in medicine, this is the oldest claiming to represent the profession of a whole nation. No other such society in the world can show a record of sixty-six annual meetings. Its membership extends beyond the national boundary. Among its 174 members are three who live in Canada and three in Cuba. Eighty-four members were present at the meeting at Hot Springs, Virginia, where the Society met for the seventh time in the last sixteen years. This gathering, of almost half of the members, compares well with the attendance at the meetings of most local societies.

The minutes of the meeting contain many facts of interest to ophthalmologists outside the Society. The editor of the Transactions, Dr. J. Milton Griscom of Philadelphia, reported there were still on hand copies of the Transactions of preceding years, from 1865 to date, except the four years 1872, 1900, 1914, and 1918. These copies should be rapidly taken up into the libraries of American ophthalmologists; for they are worth reading and keeping on hand, by every real ophthalmologist. They extend through the great formative period of modern ophthalmology, and illustrate how a branch of modern science and its associated art have developed. Each volume contains one or more papers each of which will rank as a classic.

These minutes also illustrate the reason why this Society does not have the influence on the profession that might be expected to belong to it. The Council recommended that the meeting in 1931 should be held at Victoria, British Columbia. A motion was passed that the recommendation should be approved, but that a circular letter should be sent to each member "asking him to express his views as to the propriety of meeting west of the Rocky Mountains". When responses to this letter had been received, the Council met and decided that the meeting for 1931 should be held at Asheville, North Carolina. More than five-sixths of the Society's members, and all fifteen emeritus members, live east of the Mississippi River; and of those who live west of it ten live in Saint Louis.

The Society has always maintained its high standard of membership, and

it has a limited membership which has not increased materially in the last years. This has given the impression that it would not welcome visitors. It has a special by-law on visitors: "At the discretion of the presiding officer any qualified member of the medical profession may attend a meeting of the Society, except an executive session, and may be invited to take part in the proceedings." At the 1930 meeting, in the Virginia mountains, there were ten visitors present; and visitors have always been cordially received.

The number of papers to be read at a meeting is limited to twenty-six. Those in this volume are well up to the standards of our literature, and some of them appear in this Journal. The volume contains a well reported case of "transplantation of the cornea", by Ben Witt Key, and a paper on "avertin as an anesthetic", by W. H. Wilmer; each followed by a good discussion. This volume further contains two membership theses; and also includes the revised constitution and by-laws of the Society. *Edward Jackson.*

Bulletin de la Société Belge d'Ophthalmologie (Bulletin of the Belgian Ophthalmological Society). No. 61. Analytical minutes of the 61st reunion of the society, at Brussels, November 30, 1930. Paper covers, 150 pages, illustrated. Price not stated. Brussels, Imprimerie Médicale et Scientifique, 34 rue Botanique.

The Belgian society, although originally an offspring of the Société Française, has had many years of vigorous independent existence. The membership list given in this volume includes a number of distinguished names in Belgium, and also a goodly number of non-Belgian members in the "allied" countries. The list of eight honorary members includes our own Dr. de Schweinitz. This volume records the death of Jean-Baptiste Coppez (see page 167 of the February issue of this Journal); Charles Jamain (1837-1930); and René Warlomont (1855-1930).

Of the many interesting communications recorded in this volume, briefly but effectively, several are clinical in character. But there are a number of longer original papers, including the following: by Bailliart, on the eye in vascular hypertension; by Orban, on surgery of the sympathetic nerves; by Jean Coppez, on iridocyclitis with hypertension; by Kleefeld, on lateral extraction of cataract without the vacuum cup; by Rasquin, on the prognosis of sarcomatous tumors of the choroid; by Gaudissart and Van Lint, on how, at Philadelphia, ophthalmology is taught to physicians; and by Van der Straeten, on the teaching and development of ophthalmology in Belgium, in regard to the plan for creation of a course in ophthalmology (special doctorate). At a later meeting the Société Belge d'Ophthalmologie will discuss (1) the creation of a diploma as oculist, (2) the organization of a course in ophthalmology for doctors who wish to become oculists. These two papers on a much debated and very important question, as well as other important papers in this volume, will be represented later in the abstract department of the American Journal of Ophthalmology.

W. H. Crisp.

Chinin in der Allgemeinpraxis unter Berücksichtigung pharmakologischer Befunde (Quinine in general practice including consideration of pharmacologic findings). By Dr. Med. Fritz Johannessohn, Mannheim. 232 pages, with three illustrations. Paper covers. Sent without charge to physicians on request. 1930, Bureau tot Bevordering van het Kininegebruik, Amsterdam-W (Holland).

This is a very comprehensive volume (in German) on the use of quinine. Its chapters include an account of the sources of quinine, its chemistry, its distribution and excretion in the system, its therapeutic application to various diseases, and toxicologic diagnosis and remedies, to which are added very ample consideration of the literature and a careful index. To the ophthalmologist may be of special interest the

reference, on page thirty-nine, to the fact that Morgenroth and his collaborators as well as Hirschfelder, Jensen, and Swanson have found optochin or ethylhydrocuprein (a derivative of quinine) to possess materially greater power of killing the pneumococcus than is possessed by quinine itself.

W. H. Crisp.

CORRESPONDENCE

Corneal and lenticular complications after trephining

To the editor: Recently I saw the following case, and I am writing to ask whether readers of the Journal can offer an explanation of the phenomena.

A white man fifty years old was blind in the left eye from chronic simple glaucoma; tension 60 mm., deep cup with atrophy. Right eye tension 45 mm., media clear, advanced cupping, fields about fifty percent lost. Advised trephining both eyes. Septic mouth cleaned up, kidneys normal. Blood pressure moderately elevated, moderate vascular sclerosis. Elliot trephining was performed on both eyes with iridectomy and good conjunctival flap. Atropin one percent solution used in each eye. Both eyes were inspected in thirty-six hours.

Now come the unusual features: both corneas were very steamy, both wounds filtering and tension less than normal (?), both lenses looked milky, though this was difficult to be certain about when seen through the very steamy cornea. Hot packs and atropin were used and in ten days the cornea cleared but both lenses progressed to complete uniform cataract. The tension in the left eye rose slowly but the globe was quiet. The right globe also became quiet and tension never rose above 25 mm. Schiøtz. After three months I did an extracapsular linear extraction (right eye) with deep scleral incision, found a very soft gummy lens, washed out most of the cortex, the rest was absorbed. Now there is a very deep anterior chamber with a thin secondary membrane. The patient can count fingers at eight to ten feet and the globe is quiet. Should I do a discission?

I am interested in finding a satisfactory explanation for the phenomena in the corneas and lenses; the lenses were not traumatized and I do not believe that any retinal hemorrhage occurred, as the field of the right eye is good. *X*

OBITUARIES

Samuel Theobald

In the death of Samuel Theobald, on December 20, 1930, in the eighty-fourth year of his age, ophthalmology, general medicine, and a large circle of friends sustained a great loss.

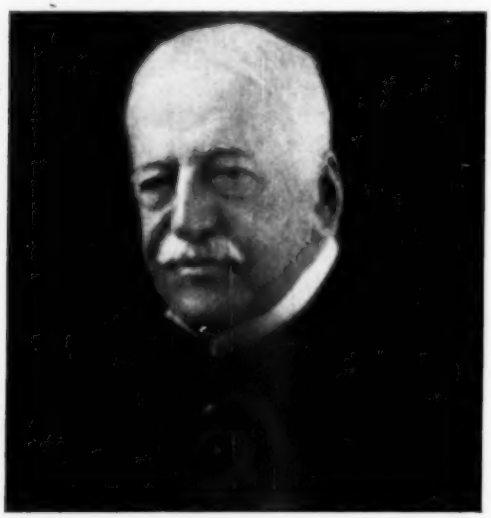
He came from lines distinguished in the art and science of medicine. His father sprang from English stock. The first member of the Theobald family in this country, Clement Theobald, settled in lower Norfolk County, Virginia, in 1641. On his mother's side, his great grandfather, Dr. Nathan Smith, organized the medical schools of Yale, Dartmouth, and Bowdoin, and assisted in the founding of Jefferson Medical School of Philadelphia. He was one of the great pioneers of American Medicine. The grandfather of Dr. Theobald, Dr. Nathan Ryno Smith, called "the Emperor", cooperated with his father and other distinguished men in the organization of the Jefferson Medical College just mentioned. He was one of the pioneers in otology in America. The French gave him the title of "the Nestor of American surgery".

Samuel Theobald, son of Dr. Elisha Warfield Theobald and Sara Frances Smith Theobald, was born in Baltimore on November 12, 1846. On April 30, 1867, Dr. Theobald married Caroline Dexter De Wolf, of Bristol, Rhode Island—a happy union that lasted sixty-one years. He is survived by two daughters, one son, eleven grandchildren, and fourteen great grandchildren.

Dr. Theobald received his early education at a well known private school in Baltimore. Later, instead of going to college, he worked and studied in the office of his grandfather, Dr. Nathan Ryno Smith; and in 1867, when twenty-one years of age, he graduated at the University of Maryland. After his graduation, he continued his associa-

tion with Dr. Smith in general medicine and surgery until 1870, when he decided to specialize in ophthalmology and otology. At his grandfather's advice he spent eighteen months abroad, studying the eye under Alt and Jaeger in Vienna, and at the Royal Ophthalmic Hospital, London. He was also a pupil of Politzer in otology.

From 1894 until 1912 he was clinical



SAMUEL THEOBALD, 1846 TO 1930

professor of ophthalmology and otology in the Johns Hopkins University school of medicine; from 1912 to 1925, clinical professor of ophthalmology; and, from 1889 to 1925, ophthalmic surgeon to Johns Hopkins Hospital. From 1925 until his death, he was professor emeritus of ophthalmology. He also had many other important positions, such as ophthalmic surgeon to the Baltimore Eye, Ear, and Throat Charity Hospital, consulting ophthalmologist and aural surgeon to South Baltimore General Hospital, and consulting ophthalmic and aural surgeon to the Home for Incurables. He was at one time president of the American Ophthalmological Society, and of the Medical and Chirurgical Faculty of Maryland. He also held membership in a number of scientific societies, including the American Medical Association and the American Otological Society.

Dr. Theobald contributed many articles to leading text-books and journals; in 1906 he published his excellent textbook, "Prevalent diseases of the eye". This volume of 551 pages is full of helpful suggestions to the general practitioner and to the ophthalmologist. The author's painstaking care is shown by the fifteen and a half pages of small type devoted to "synopsis of contents", in addition to an excellent index. Many of the external diseases of the eye are beautifully illustrated in color by his son, Samuel Theobald Jr.

He did much to popularize boric acid. His genius is memorialized in his method of treating closure of the tear ducts, and in "Theobald's lachrymal probes". In his scientific work he showed the capacity for infinite pains; in his ethical relations to his colleagues he set a high ideal; to his friends he showed a character full of charm. "A lovelier gentleman . . . the spacious world cannot again afford." *W. H. Wilmer.*

Edgar Steiner Thomson

(The following details are taken from an account of the late Dr. E. S. Thomson which was prepared by Dr. F. N. Irwin for the New York Ophthalmological Society.)

Dr. Edgar Steiner Thomson was born at Mount Savage, Maryland, on December 18, 1871. He died at his home in New York City, January 12, 1931.

His father was major and surgeon in the Federal Army in the Civil War. His grandfather, Alexander Thomson, was a supreme court judge; his great-grandfather, Archibald Thomson, was a Revolutionary soldier and officer, and his great-great-grandfather, Alexander Thomson, the founder of the family in this country, came from Scotland to Pennsylvania in 1771. Dr. Thomson was a nephew of Dr. William Thomson of Philadelphia, one of Philadelphia's leading ophthalmologists of the latter part of the nineteenth century. Dr. William Thomson did some excellent pioneer work in color-blindness.

Dr. E. S. Thomson was educated in

Allegheny Academy, Maryland, and by private tutors. He received his medical degree in 1893 from the University of Pennsylvania, where he was a member of the Phi Alpha Sigma fraternity and of the D. Hayes Agnew Surgical Society.

We was an interne at Kings County Hospital in 1894 and immediately after finishing that service became a member of the house staff of the Manhattan Eye, Ear, and Throat Hospital of New York City. He was assistant surgeon at the Manhattan from 1895 until 1902, when he became surgeon director of his clinic, as well as a director of the Manhattan.

Among other appointments, he was professor of ophthalmology at the Manhattan Postgraduate Medical School, and for some years was an instructor in ophthalmology at the New York Postgraduate Medical School and Hospital, and also professor of ophthalmology at the New York Polyclinic Medical School and Hospital. He was a member and one-time president of the New York Ophthalmological Society, to which he was elected in 1899, a member of the American Ophthalmological Society, and a former secretary and vice-chairman of the Section on Ophthalmology of the American Medical Association.

At the entry of the United States into the World War he became a member of the Special Draft Bureau of the Manhattan Hospital, which examined prospective aviation force members, and in 1918 he was commissioned a major in the Army Medical Corps, serving until the end of the war at United States General Hospital No. 1 in New York.

His professional writings were many. To Wood's American Encyclopedia of Ophthalmology he contributed a monograph on "Electric appliances and their use in ophthalmic surgery". He was author of "Your eyes and their care", published as a part of the Appleton Health Series. He was one of the first ophthalmologists to advocate trephining and aspiration in retinal detachment, reporting many striking successes from this surgical procedure. He had in his practice an unusual number of cases of diseased eyes due to sinus disease, and in 1928 he wrote an exhaustive paper entitled "Ocular involvement in sinus diseases", published in the Laryngoscope, in which he reviewed the literature on this subject and cited forty-four of his own private cases, giving in great detail the history of each case from onset to termination,

EDGAR STEINER THOMSON, 1871 TO 1931

beside stressing early recognition of these cases and thorough and properly done sinus operations.

Edgar Thomson had the soul of an artist: his love for music and his skill as a violin player led him to organize a string quartet early after his arrival in New York, he playing the first violin. This quartet met at his home for thirty-seven years, playing the works of Bach, Beethoven, Mozart and Brahms, as well as those of more modern composers. The last performance of the quartet occurred the week before Dr. Thomson's final illness.

Edgar Thomson's knowledge of musical literature was extensive. His capacity for rapid grasp of musical language was outstanding.

F. N. Irwin.

Hiram Woods

In the death of Dr. Hiram Woods American ophthalmology has lost an outstanding figure and his Baltimore colleagues a most sympathetic and helpful friend.

He was born at Baltimore in 1857, and died at the Union Memorial Hospital on January 15, 1931, of pneumonia.

He was educated in George Carey's private school in Baltimore, and at Princeton University, where he graduated in 1879. His medical education was obtained at the University of Maryland, at which institution he received his Doctor of Medicine in 1882.

HIRAM WOODS, 1857 TO 1931

He served one year as interne at Bay View Hospital, after which he was connected with the University of Maryland, first in the department of dermatology and later in the department of ophthalmology and otology.

From 1887 to 1894 he was professor of ophthalmology and otology at the Woman's Medical College of Baltimore. In 1895 he returned as lecturer in ophthalmology and otology at the University of Maryland, and he was shortly elected to be head of the department, in which capacity he served until 1920. In this field of endeavor he was especially talented, and he took great delight in demonstrating various lesions to the students.

For many years he was surgeon to the Presbyterian Eye, Ear, and Throat Charity Hospital, where his ability as a surgeon was utilized by the many seeking relief, and where he often had demonstrations for his students. The meticulous care which he took of his patients in those early days made him stand out among his colleagues.

He was elected to many positions of honor. Locally he served on several occasions as chairman of the ophthalmological section, in 1906 he was president of the Maryland Medical and Chirurgical faculty, and later he was chairman of the council. In 1912 he was chosen as chairman of the Section on Ophthalmology of the American Medical Association and in 1919 as president of the American Ophthalmological Society.

Possibly his geniality and good fellowship were shown to best advantage while attending these association meetings, which he enjoyed most thoroughly, and his absence from which in the last few years has been deeply regretted by his old associates.

Dr. Woods made many contributions to our literature, all of which were of a clinical nature but exceedingly well prepared and of permanent worth. His chief hobby was work, to which he devoted himself until his recent retirement from active practice. His son, Dr. Alan Woods, has followed his footsteps in ophthalmology.

C. A. Clapp.

ERRATUM

Dr. Dewey Katz calls attention to the fact that on page 914 of the October, 1930, issue of this Journal the abstract of his paper on Salzmann's nodular corneal dystrophy errs in indicating that marked elevation of the nodular opacity is absent in this clinical entity as described by Salzmann. Such elevation is actually one of the most important characteristics of this condition.

ABSTRACT DEPARTMENT

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history

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1. GENERAL METHODS OF DIAGNOSIS

Braun, Reinhard. **The value of the intracutaneous tuberculin reaction according to Mantoux (or Mendel) as an aid to the recognition of tuberculous diseases of the eyes.** Graefe's Arch., 1930, v. 124, p. 182.

The reaction obtained by intracutaneous injection of 0.1 c.c. of a dilution of 1 to 1,000,000 of Koch's old tuberculin according to Mantoux (or Mendel) was observed in two hundred cases of ocular disease. Among the latter some cases were definitely tuberculous, others questionably tuberculous, and the remainder were definitely not tuberculous. The author's results indicated that this reaction did not aid the diagnosis as far as it concerned the tuberculous etiology of an ocular process. In fact the number of strongly tuberculin-sensitive cases among definitely tuberculous ocular diseases was only about twenty percent higher than among the definitely nontuberculous.

H. D. Lamb.

Chiazzâro, D. **Note on the diplobacillus of Morax and Petit.** Ann. d'Ocul., 1930, v. 167, Nov., pp. 907-918.

The author's conclusions are that though the diplobacilli of Petit and the diplobacilli of Morax present a vague morphological resemblance they are distinctly different culturally. Biologic reactions in rabbits also indicated that the two organisms are unrelated. Furthermore the clinical pictures in man illustrate this.

Lawrence T. Post.

Pavkovits-Bugarzky, G. **The value of the settling-time reaction in eye diseases.** Klin. M. f. Augenh., 1930, v. 85, Oct., p. 528.

The author describes this method as applied to 300 patients presenting the most varied eye diseases. He found acceleration of the settling time in trachoma with ulcerating pannus, in lymphatism, and also in tuberculous, luetic, rheumatic, and nephritic eye affections such as a parenchymatous keratitis, iritis and iridocyclitis. It was most marked in processes with disintegration of tissues, especially purulent. The reaction has differential diagnostic value in rheumatic iritis, otherwise its value is slight. Greater is its prognostic significance, especially in affections inclining to relapses, since it clearly indicates whether the disease is improving or whether a relapse is to be expected.

C. Zimmermann.

Salzer, Fritz. **Results of survey perimetry (Ueberblicksperimetrie).** Klin. M. f. Augenh., 1930, v. 85, supplement, p. 34.

At the International Ophthalmological Congress at Amsterdam, Salzer

demonstrated his survey perimeter. His experience with the instrument controlled by other methods of perimetry in daily practice, within the last six years, has proved it to be a valuable aid in furnishing rapid orientation on disturbances of the visual field. The apparatus may also be used for testing the light sense and other physiological optical experiments.

C. Zimmermann.

Zamenhof, Adam. **A new method for observation of the ocular fundus in focal light.** Graefe's Arch., 1930, v. 124, p. 87.

Observation of the ocular fundus in focal light is very important, but because of technical difficulties with the general method it has been little used. Adjustment to bring the image of the slit to the place where the inverted image of the retina occurs facilitates such observation, especially in the use of the simplified large Gullstrand ophthalmoscope. For the majority of clinical examinations in focal light, the twenty-times binocular telescopic glass or the forty-times uniocular eye-piece suffices. The latter is moreover really useful only with this kind of lighting. In the focal light of the nitra-lamp with a red-poor filter, there can be distinguished clearly enough the yellow macular color and the nerve-fiber markings. *H. D. Lamb.*

2. THERAPEUTICS AND OPERATIONS

Arruga. **A new eye speculum to eliminate pressure of lids on globe during intraocular operations.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, May, p. 247.

While no speculum is the equal of a skilled assistant, this instrument, demonstrated at the Amsterdam Congress, offers the following advantages: (1) prevents squeezing; (2) is adaptable to every patient; (3) gives a wide operating field; (4) permits downward fixation of globe by passing silk suture through superior rectus and attaching it to speculum. *M. Davidson.*

Bambach, C. P. **Tuberculin therapy in ophthalmology.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, June, p. 297.

The author's experience with Prof. Viton's method of tuberculin therapy in what Viton calls the ocular manifestations of paratuberculosis has been most satisfactory. The fantastically weak dilutions employed by Viton—as weak as one millionth of old tuberculin—have been ridiculed, but proof of their activity is found in febrile reactions. A Mantoux test with the 1/10000 dilution is used for diagnosis, and intensity of reaction is guide to dose. Presence of pulmonary tuberculosis is a contraindication to its use. A one drop dose increasing by one drop is used twice weekly for from months to years. General, local, and focal reactions are avoided. Of the fourteen cases selected for illustration the inflammatory group —comprising cases of iritis, cyclitis, conjunctivitis, keratitis and scleritis— responded well, while two typical cases of tuberculosis of the conjunctiva did not respond at all. *M. Davidson.*

Federici, E. **Permanent corneal changes from applications of diathermy.** Arch. di Ottal., 1930, v. 37, Aug., p. 293.

Application of diathermy to the ocular tissue produces corneal infiltration and deepithelialization, as well as intense conjunctival chemosis. The author has reproduced experimentally and examined histopathologically these serious corneal changes. The examination disclosed nothing of advantage, and for this reason such treatment should not be used in eye diseases.

David Alperin.

Gutmann, A. **Light treatment of eye diseases with the focal ultraviolet lamp model 2.** Klin. M. f. Augenh., 1930, v. 85, Dec., p. 782.

A few years ago Gutmann constructed an inexpensive lamp, avoiding the disadvantages of the carbon arc and mercury quartz apparatus, since these give diffuse glaring and too much shortwaved light, which is not required

for ocular therapy. By interpolation of uviol glass plates, 1 mm. thick, the excessively glaring rays are eliminated, but ultraviolet to 280 millimicra is transmitted. A quartz lens of 20 diopters concentrates the rays focally on the diseased area, avoiding diffusion over the whole eye. Radiation for two minutes gave very good results in eczema of the skin of the lid, ciliary blepharitis, chronic and eczematous conjunctivitis, scrofulous and parenchymatous keratitis, serpent ulcer, and iritis. Previous application of a drop of fluorescein renders the tissues and the bacteria more sensitive to light and increases the effect of radiation. Simultaneous general treatment must not be neglected. *C. Zimmermann.*

Haass, F. **Remarks on nonspecific therapy, especially with protasin and perprotasin.** Zeit. f. Augenh., 1930, Dec., v. 73, p. 50.

Szily has shown histologically that parenteral injection of nonspecific proteins results in an inflammatory reaction in the eye, followed by a phase in which inflammation is retarded. It would be desirable to find an agent which directly produced this second, antiinflammatory stage. The author calls attention to the fact that protasin and perprotasin are such agents, as proved by clinical observations which he has published elsewhere.

F. H. Haessler.

Jahnke, Walter. **Examination and treatment of the conjunctiva before operations opening the eyeball.** Klin. M. f. Augenh., 1930, v. 85, Nov., p. 642.

Postoperative infections depend on the number and virulence of the conjunctival germs. Forty-three percent of the patients at the eye clinic in the University of Berlin presented before operation virulent germs in the conjunctival sac; pneumococci, hemolytic and nonhemolytic (mostly viridans) streptococci, staphylococcus aureus, and hemolytic staphylococcus albus. The blood plate of Schottmüller seemed to be the best culture medium. Two percent yellow ointment and a bandage rapidly and safely reduced the number of germs. *C. Zimmermann.*

Weiss, C. E. **Disinfection of glass rods and probes.** Klin. M. f. Augenh., 1930, v. 85, Nov., p. 674.

For disinfection of glass rods and probes Weiss recommends placing them in rivanol 0.04, distilled water 5.5, gelatin 2.3, and glycerine to make 40.00, heated in the water bath and poured into a dish where it forms a jelly. *C. Zimmermann.*

Wilkinson, W. C. **Treatment of eye diseases by tuberculin.** Brit. Med. Jour. 1930, v. 1, June 14, p. 1090.

The writer believes that tuberculin therapy is of value in various chronic diseases of the eye supposedly due to tuberculosis. Nine cases are reported.

Ralph W. Danielson.

Wilmer, W. H. **Avertin as an anesthetic in ophthalmic surgery.** Trans. Amer. Ophth. Soc., 1930, v. 28, pp. 42-52.

Avertin, or tribromethanol is a white crystalline substance, unstable when exposed to light and air, soluble in water at 40 degrees C. up to 3.5 percent.

The evening before the operation, some hypnotic is given to very nervous and psychic patients, but in all cases a mild cathartic, such as phenolphthalein, is administered. On the morning of the operation the lower bowel is thoroughly cleansed with a soap-suds enema. One-half hour before the time scheduled for the operation the avertin solution (100 milligrams per kilogram of body weight) at body temperature is injected into the rectum with a glass syringe, through a fairly large rectal tube. The room is darkened and the patient kept quiet until sent to the operating room. In all cases which require supplementary anesthesia atropin is injected hypodermically before the use of ether.

In the cases here reported the average length of operation was twenty-seven minutes, the average length of

the narcosis three and one-half hours, the duration of secondary sleep from brief naps to eighteen hours.

Avertin is contraindicated in marked renal disease, impaired kidney function, pulmonary tuberculosis, hepatic affections, advanced diseases of the blood, colitis, diseases of the rectum, or in aged and debilitated patients. The advantages of its use are the rapidity of its effect, the elimination of the preliminary period of anxiety, relaxation of the external muscles of the eye and of its appendages, no congestion of ocular tissues, and less bleeding. It has a tendency to reduce blood-pressure, so that in cases of hypertension it lessens the danger of intraocular hemorrhage.

Edward G. Lear.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Apin, Carl. **Determination of refraction with Rössler's cobalt lamp.** Klin. M. f. Augenh., 1930, v. 85, supplement, p. 137.

According to Apin's investigations, Rössler's cobalt lamp cannot be recommended for practical determination of refraction. *C. Zimmermann.*

Brunner, Willy. **The manner of inheritance of the various types of congenital red-green blindness.** Graefe's Arch., 1930, v. 124, p. 1.

In the great majority of individuals unable to distinguish colors, those brothers with a heterozygotic mother and those related more distantly (cousin, grandson, grandfather, nephew, and uncle on the mother's side) have the same disturbance of color. This confirms the opinion of Waaler that the various kinds of red-green blindness are dependent genotypically on definite but different factors. There are cases that make one think that in addition to Waaler's four types (deuteranomaly or partial green blindness, deuteranopia, protanomaly or partial red blindness, and protanopia), a special hereditary factor lies at the basis of two additional intermediate types, namely the extreme deuteranomaly and the extreme protanomaly. The author agrees with Just and Waaler that the factors on the one hand for deuteranomaly and deuteranopia, and on the other hand for protanomaly and protanopia, are allelomorphs in which the tendency for deuteranomaly dominates over that for deuteranopia and the gene for protanomaly over that for protanopia. In the sense of Goldschmidt's theory, we can consider that there exists a qualitative difference between the hereditary factor for the deuteranopic system and that for the protanopic system, and that each of the three types of disturbance belonging to each system can be looked on as quantitatively different expressions of this qualitatively similar hereditary factor.

H. D. Lamb.

Duane, Alexander. **Accommodation.** Arch. of Ophth., 1931, v. 5, Jan., pp. 1-14.

Helmholtz' theory is generally accepted. But certain facts are at variance with this theory. It can be definitely shown that accommodation begins to fail at least by ten years of age. Loss of elasticity of the capsule at such an early age does not appear logical. That presbyopia may be the result of loss of power in the ciliary muscle the author demonstrates in the following manner. The two factors in accommodation, lenticular expansibility and ciliary contraction are neither equal nor correlative. The ciliary factor is always in excess of the lenticular. The amount of accommodation for near objects is recorded in diopters. The units of ciliary effort expended for each diopter of accommodation may be called myodiopters. There must always remain a certain number of latent myodiopters. According to the usual interpretation of Helmholtz' theory, the amount of latent and therefore useless ciliary energy grows very great with advancing age. If such were the case, there should be no fluctuation in accommodative power in persons over thirty years of age. With such latent energy, it is inconceivable that the maximum power would be subject to increase by any

means whatsoever. But this can be done under the influence of convergence. If the latent myodiopters vary greatly with age, complete cycloplegia should require an increasing length of time with advancing age. But such is not the case. On the basis of Helmholtz' theory, one must admit that the ciliary power diminishes with age in such an amount that the latent energy becomes less rather than greater with advancing age. According to the theory of Tscherning, or other hypotheses ascribing accommodation to be the result of external stress applied directly to the lens, the ciliary power would have to increase up to middle life, slowly decreasing thereafter. Or both processes might act together. In conclusion, the author feels that the evidence of physiological optics is strongly in favor of the Helmholtz theory, but that the physiology and anatomy of clinical observations point rather to those theories depending upon external pressure applied directly to the lens itself.

M. H. Post.

Dufour, M. **Aberration of the spherical diopter: relation between the aberration and the astigmatism.** Ann. d'Ocul., 1930, v. 167. Dec., p. 998.

The author describes a relatively simple method of demonstrating (what he has demonstrated more technically elsewhere) the relation between the aberration and the astigmatism of the peripheral rays of the spherical diopter.

Dufour, M. **Astigmatism of the pencil refracted by a spherical diopter.** Ann. d'Ocul., 1930, v. 167, Dec., p. 993.

The author demonstrates a simple method of evaluating this astigmatism.

Gala, A. **Myopia and glaucoma.** Oft. Sbornik, 1930, v. 5, pp. 119-125. (See Section 8, Glaucoma and ocular tension.)

Gutzeit, R. **Paralysis of accommodation after taking a powder containing extract of belladonna.** Klin. M. f. Augenh., 1930, v. 85, Nov., p. 673.

A laborer aged forty-four years, after taking for a gastric affection a teaspoonful of a powder containing extract of balladonna from 0.01 to 0.015 gm., complained of impaired vision and flickering. V. 5/15, with +2.50 sph. = 5/4. He required for reading + 5.50 sph. The pupils were of normal width and showed normal reaction. Three days after discontinuing the powder, this isolated total paralysis of accommodation had subsided and the patient had normal vision without glasses.

C. Zimmermann.

Hartline, H. K. **The dark adaptation of the eye of Limulus, as manifested by its electrical response to illumination.** 1929-1930, Jour. Gen. Physiology, 13, p. 379.

Living animals were used in these experiments. By means of pins and plaster of Paris the animal is securely fixed in a light-proof moist chamber. By placing one electrode on the cornea, and another on the skin near the back of the eye, the difference in electrical potential could be determined when a single brief flash of light was made to shine in the eye. The results of these analyses showed that the process of dark adaptation in Limulus might be represented by a chemical reaction of the second order, that is, the recombination of products of photolysis to renew the depleted supply of photosensitive material. This is in accord with Hecht's conception of the human reaction and in agreement with the results obtained by other methods in several different types of animal.

M. E. Marcove.

Jackson, Edward, and O'Rourke, D. H. **Changes in refraction with presbyopia.** Trans. Amer. Ophth. Soc., 1930, v. 28, pp. 222-230.

Each of 4,627 cases of refraction was measured with the refraction ophthalmoscope, the ophthalmometer, and skiascopy (usually with cylinders), and was tested with trial lenses. Occasionally full cycloplegia was resorted to, after forty or fifty years of age,

when results obtained without it seemed uncertain.

After studying the results obtained, one will probably be convinced that careful measurement of refraction is even more important for presbyopes than for younger patients.

The changes of spheric refraction in the eyes of those who have reached the age of presbyopia are frequent enough and great enough to deserve more attention, especially the changes in astigmatism, which are more general and characteristic at and after middle life.

The statistics indicate that the tendency of the meridian of greater refraction to pass from the vertical to the horizontal position, manifest earlier in life, becomes greater and more striking in the early years of presbyopia and continues until the end of life. The tendency is so strong that the horizontal hyperopic axis, frequently called "astigmatism against the rule", and rightly believed to deserve that name in early life, comes after the age of seventy to affect sixty-two percent of all astigmatic eyes. These changes in astigmatism, so common in presbyopic eyes, seem to be caused by changes in the astigmatism of the lens.

The proper study of presbyopia, and the refractive changes confused with it, may lead to a better understanding of senile involution of the lens, of cataract, glaucoma, and other conditions that cause much visual disability.

Edward G. Lear.

Kravkov, S. W. **A central influence on the visual acuity.** Graefe's Arch., 1930, v. 124, p. 76.

Experiments were performed to determine the possible effect upon the visual acuity of one eye by a light falling upon the other eye. During the latter the visual acuity is improved when the test object used is a black object upon a white background, while it is diminished when a white object lies upon a black background. Such an improving and diminishing influence from the light in the fellow eye continues for some time after its removal, and shows in gradual diminution of the visual acuity (in the first case) and in its gradual improvement (in the second case). When the light in the fellow eye falls upon a disparate retinal half, this effect on the visual acuity is lacking. A difference in color between the light affecting each eye does not prevent this effect from occurring. *H. D. Lamb.*

Kronfeld, P. C., and Devney, Clarissa. **The frequency of astigmatism.** Arch. of Ophth., 1930, v. 4, Dec., pp. 873-884.

Previous to this paper, no attempt has apparently been made to investigate the distribution of the total astigmatic error with relation to the three main refractive states, emmetropia, myopia, and hyperopia. In these cases, 10,000 from the office practice of E. V. L. Brown, the total astigmatism was determined by retinoscopy under complete cycloplegia. By a very ingenious method of tabulation, the authors arrive at the following conclusions:

The differentiation between physiologic and pathologic astigmatism is justified. The curve for the former parallels the general refractive curve. The curves for the higher degrees of astigmatism, that is, over one diopter, show their lowest points corresponding with a refraction requiring plus 1.25 sphere, increasing with the hypermetropia and myopia, reaching somewhat higher frequencies on the hypermetropic side. A requirement of plus 1.25 sphere is shown to be the most frequent error of refraction, and that at which nonastigmatic states are most frequently found. *M. H. Post.*

Loy, A. W. **A correlation of the results of recent experiments on peripheral vision.** Military Surgeon, 1930, v. 67, July, p. 17.

By using a moving disc of various sizes and at different angles, Loy concludes that perception of motion and change of position is most acute in and about the macula, but it diminishes toward the periphery, perception of

motion falling off more rapidly than perception of discontinuous change of position. *Ralph W. Danielson.*

Markus, Stefan. **Practical success with cylinder skiascopy.** Zeit. f. Augenh., 1930, v. 72, Oct., p. 304.

The author uses Lindner's method of retinoscopy with cylinders in a large active dispensary practice, in cases in which direct examination at the trial case does not give a satisfactory result. He finds the method very reliable and also practicable even when time is limited. *F. H. Haessler.*

Meisling, A. A. **Color-blindness among school children.** Det oftalmologiske Selskab i Københavns Forhandlinger, 1930, pp. 38-39. In Hospitalstidende, 1930, Dec. 11.

It is estimated that there are 2,200 color-blind boys and 200 color-blind girls in the public schools of Copenhagen (population 587,000). Attention is called to the disadvantages to these pupils incident to all school work in which classifications are made on the basis of colored cards or charts, and to the injustice that may be done to these pupils as to their class standings, if their color-blindness is not known to the teachers. *D. L. Tilderquist.*

Mendoza, R. **The clinical application of biastigmatism.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, May, p. 243.

Cases are cited to illustrate the need of trying to improve vision still further by an additional cylinder at a different axis after the best vision has been secured by a spherocylinder, in accordance with the teachings of Marquez. Biastigmatism explains those cases which show a discrepancy between the subjective and objective findings or between the various objective determinations themselves.

M. Davidson.

Percival, A. S. **Toric spectacles.** Brit. Jour. Ophth., 1930, v. 14, Dec., p. 623.

This is a discussion of the proper method of prescribing a toric lens in the form of cross cylinders. At least the toric base should always be indicated. Commercially toric tools are made $\pm$ 3.00 D., $\pm$ 6.00 D., $\pm$ 9.00 D.; $\pm$ 6.00 D. being the commonest. Quite a number of illustrative combinations are given which should be consulted in the original by those interested. Many combinations can be produced to advantage as periscopic lenses. In low concave spherocylinders toric lenses are unnecessary. Bifocals in aphakic patients are unsatisfactory where a cylinder correction is required. Bifocals in myopes are not recommended unless of low degree; two patients with a myopia of less than 6.00 D. acquired detached retina. A table showing the conversion of convex and concave lenses into periscopic lenses accompanies the contribution.

D. F. Harbridge.

Raubitschek, E. **Determination of astigmatism with arrow skiascopy.** Zeit. f. Augenh., 1930, v. 72, Nov., p. 337.

This is a subjective method for accurately measuring astigmatism. The patient, whose eye is made slightly myopic, is shown a disc which can be rotated and on which are two parabolic lines so placed as to resemble an arrow head. Just as in Lindner's skiascopy with cylinders, very slight rotation from the proper axis makes a marked difference in the relative brightness of two curves of the design.

F. H. Haessler.

4. OCULAR MOVEMENTS

Kestenbaum, Alfred. **The development of ocular movements and optokinetic nystagmus.** Graefe's Arch., 1930, v. 124, p. 113.

Observations on the ocular movements were made with a revolving drum in seventy infants varying in age between ten days and thirteen months. There was first noted (at from two to three weeks) the formation of a fairly normal optical movement of fixation and at the same time or a little later the ability to follow a moving object, although not with the normal gliding mo-

tion. At this stage the motion of the eyes in following a moving object occurred in an interrupted manner or in the form of jerks as if made up of short fixation movements. Then gradually, through a diminution in the frequency of the interruptions or jerks, there arose the gliding motion. This transition occurred at some time after the third month, but the gliding motion was constant by about the fifth month. When the lateral motion was once developed, it was always present in a normal degree to the extreme lateral limit. At about the fifth month was first noted ocular fixation to sound, that is the looking toward the source of a noise. In passive head turning in older infants a definite difference was recognizable between the ocular behavior on the presentation of a fixation object and that without it. There occurred in the former case, at from about the second to the third month, a predominance of the optically dependent "compensatory ocular following motion" over the primitively strong ocular deviation of labyrinthine origin. Optokinetic nystagmus was noted occasionally in the fifth week, but occurred constantly at about three and a half months, or about the same time as the movements of the eye following a moving object became smooth and gliding. This is analogous to the clinically observed occurrence of optokinetic nystagmus at the same time as an attack of the interrupted or jerky form of the following motion of the eyes. There is thus a further argument for intimate connection of optokinetic nystagmus with the ocular following movements dependent upon the fixation mechanism. *H. D. Lamb.*

Schweinitz, G. E. de. **Complete bilateral congenital exterior ophthalmoplegia and double ptosis.** Arch. of Ophth., 1931, v. 5, Jan., pp. 15-28.

The patient, a woman of forty-four years, had violent headache and vertigo, often lasting long periods of time. There were also various temporary disturbances, supposedly functional. She had had a high refractive error and gradually diminishing vision for the last four years. She had six attacks of unconsciousness lasting from four hours to four days. These were always preceded by dizziness and numbness, especially of the right side of the body, and were followed by vomiting. Lately attacks of blindness had occurred. Examination showed that all the teeth had been removed. There were various skin areas of anesthesia, hysterical in pattern. The patient was dull mentally. In the hospital an attack of unconsciousness was overcome by an emetic. The glasses could not be improved. The pupillary reactions were normal, except that which usually accompanies convergence, which latter function was absent. The eyeballs were fixed and double ptosis was present. The ophthalmoscopic examination was normal. Visual fields on admission showed complete absence of the nasal fields, with considerable contraction, suggesting an incomplete binasal hemianopia. The spinal fluid was normal. Encephalograms revealed bilateral cortical atrophy in the frontal and parietal regions. The cisterna was prominent. Some calcification of the falx cerebri was present. After twelve days the patient returned home unimproved, but two weeks later she was better. At the end of five weeks she returned for inspection. The headaches and attacks of unconsciousness had ceased, and the fields had almost assumed normal proportions. A faint intorsion of the right eye was noted.

Total bilateral external congenital ophthalmoplegia with double ptosis is rare. Minimal excursions usually occur inward or outward. The relief of headache experienced by the patient was attributed to the drainage of cerebrospinal fluid followed by the air injection. The disappearance of the attacks of unconsciousness and amaurotic manifestations, with cutaneous and mucous membrane anesthesia, was held to be due to repeated suggestion. The author ascribes the condition to nuclear aplasia or dysplasia, associated with imperfect development and structural defects of the external ocular muscles.

M. H. Post.

Sorsby, Arnold. **Latent nystagmus.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 1.

The author reviews the literature on this uncommon condition. Reported cases show that it may be elicited by covering one eye; by both open eyes being turned in the extreme position, the nose acting as a screen; by the intervention of a rod in reading near print; and by the use of a prism with the base placed in certain positions. In at least one instance both eyes looking at a distance developed nystagmus, but fixing at a near point showed no nystagmus. Five well studied cases are discussed by the writer. All writers on the subject have assumed that latent nystagmus is a distinct entity with constant clinical features. A careful study of the cases reported in the literature leads one to doubt this, for there appears to be very little that is common to all the cases. (Extensive bibliography.) *D. F. Harbridge.*

Thomas, J. W. T. **Miners' nystagmus and incapacity for work.** Jour. Industrial Hyg., 1930, v. 12, Jan., p. 1.

In this series of 512 cases, the average age at which the disease appeared was forty-one years, and the average period spent at underground work before becoming incapacitated was twenty-seven years. Defective eyesight does not seem to have any influence in the development of this type of nystagmus. Nervousness and apprehension, illness, and injury to the eye influence the onset in a large percentage of cases. The period of total incapacity with the first attack is usually three years; a second attack almost always occurring after work has been resumed for three or four years. The first attack is less prolonged in young men, but there is no evidence that the older men are more prone to recurrence. There is a wide variety in the type of nystagmus present. The most frequent oscillations are rotary, uniform in rate and equal in each eye. The movements are aggravated by looking up and by stooping. The wearing of corrective lenses does not influence recovery from the disease. *M. E. Marcove.*

Thorne, F. H. **A review of ocular muscle imbalance** (with report of 244 cases). Military Surg., 1930, v. 66, Feb., p. 175.

This paper gives a very comprehensive review of the types, causes, symptoms, and diagnosis of extrinsic muscular disturbance. Esophoria up to and including four diopters, exophoria up to and including two diopters, and hyperphoria up to and including one-half diopter are considered normal in testing muscular imbalance for the flying service. A disqualifying table for various classes of flying is included.
M. E. Marcove.

5. CONJUNCTIVA

Andrade, Lopes de. **Some researches on trachoma. Biomicroscopic and histopathologic study.** Ann. d'Ocul., 1930, v. 167, Dec., pp. 1027-1047.

The first half of the paper is devoted to description and illustrations of the biomicroscopic appearances of trachoma, acute conjunctivitis, and vernal catarrh after vital staining. The principal differences are in the vessels.

The last half of the paper is devoted to histopathological description of trachomatous lids in the various stages of the disease.
Lawrence T. Post.

Deuchler, D. **Trichophyton cerebriforme in the conjunctival sac.** Klin. **M. f.** Augenh., 1930, v. 85, Nov., p. 649.

In herpes tonsurans of the skin the trichophyton may occasionally invade the skin of the lids and the conjunctiva and create a conjunctivitis. Without affection of the skin trichophyton had so far not been observed exclusively in the conjunctival sac until Deuchler found it in the secretion of chronic conjunctivitis of seven cases which are reported. Excised pieces of the conjunctiva showed plasmocellular infiltration but no fungi. Pure cultures were obtained in two cases only, in the others they were overgrown with

staphylococci. The conjunctiva showed slight irritation, and in some cases only one eye was affected. It was peculiar that so many persons from different parts of the country were seen in one month (August). Sulphate of zinc and noviform salve cured the condition.

C. Zimmermann.

Giani, Pietro. **Microbiologic researches on trachoma.** Arch. di Ottal., 1930, v. 37, Aug., p. 289.

The author has isolated from trachomatous follicles a flavobacterium which accompanies but is distinct from bacillus granulosis of Noguchi. He does not, however, attribute any etiologic significance to it. Both Flexner and Noguchi have found this yellow bacterium accompanying bacterium granulosis. *David Alperin.*

Kreiker, A. **Clinical findings and histology in xerosis of the conjunctival epithelium.** Graefe's Arch., 1930, v. 124, p. 191.

Study of seventeen cases of epithelial xerosis among about 50,000 patients consulting the university eye-clinic at Debrecen (Hungary) between 1922 and 1930 showed that the cause of the disorder was mostly a disturbed absorption of vitamin A because of alcohol.

In the development of a Bitot's spot, several stages could be differentiated. First the goblet cells disappeared and the epithelium took on an epidermis-like character although without cornification. These early changes constitute the first stage of prexerosis. The second stage is a hyaline-like transformation of the outer layers of the epithelial cells. Under these changed cells arises the zone of cornification which gradually reaches the surface as the result of breaking and desquamation of the degenerated superimposed layers.

At this stage Bitot's spot comes into existence. Parallel with the epithelial changes a degeneration in the subepithelial tissue occurs with thickening of the fibers, great scarcity of cells, and dilatation of the lymph spaces. From all of this, it follows that there can exist a xerosis without macroscopically visible signs; a large part of the hemeralopia is probably related to this prexerosis.

The xerosis of trachoma apparently shows considerable similarity to the epithelial form and is perhaps the result of a local disturbance of nutrition.

H. D. Lamb.

McKee, S. H., and Murphy, E. V. **Diphtheria of the conjunctiva.** Trans. Amer. Ophth. Soc., 1930, v. 28, pp. 86-91.

One of the most virulent but fortunately one of the rarest of conjunctival infections is that caused by the Klebs-Loeffler bacillus. Textbooks describe two forms of diphtheric conjunctivitis, the superficial or croupous, and the deep form, which runs a much more serious course.

A girl of eight months showed a fine fading rash on face, trunk, and extremities. The lids were swollen, hard, and almost completely closed. There was a profuse purulent discharge, and on the palpebral conjunctiva of the four lids there was found a well marked grayish-white membrane adherent to the conjunctiva, and whose removal caused slight bleeding. The temperature was 102°, pulse 162, and respirations 38. There were no other signs of diphtheria about the child. The culture was positive for Klebs-Loeffler bacillus. The treatment consisted of twenty thousand units of antidiphtheric serum intraperitoneally, locally boric acid irrigations, one percent silver nitrate, and an ointment to the lids. The patient was discharged cured.

In the discussion it was pointed out that a diagnosis of diphtheric conjunctivitis made from cultures, without animal inoculation, was meaningless.

Edward G. Lear.

Marcus, I. M., and Weiner, K. G. **Morphologic blood changes in trachoma.** Ukrainskii Oft. Jour., 1929, v. 1, pp. 169-175.

The authors submit their findings in fifty-six cases, which are not in accord-

ance with those of Towbin and Okunew (Russian Oft. Jour., 1928, number 1; abstracted in Amer. Jour. Ophth., 1929, v. 12, Jan., pp. 59-60. (1) The trachomatous virus has no influence on the blood elements—the percentage of hemoglobin, erythrocytes, leucocytes, neutrophiles, and lymphocytes is within normal limits. (2) The trachomatous virus provokes no regenerative phenomena in the blood, as the reticulocytes and polychromasia are within physiologic limits. (3) There is an increase in the eosinophiles of trachomatous patients; but, taking into consideration that 63.3 percent of trachomatous patients are carriers of intestinal parasites, and that forty-one percent of eosinophiles were found in control patients suffering from other ocular diseases, such as cataract, glaucoma, optic nerve atrophy, and retinitis proliferans, of whom forty-eight percent were also subject to helminthiasis, the eosinophilia in trachoma cannot be considered specific, but should rather be ascribed to helminthiasis. (4) The negative findings in conjunctival deposits, coinciding with those reported in the literature, confirm the conclusion that eosinophilia is not specific for trachoma.

J. I. Gouterman.

Martinez Salaberry, J. **Chloride treatment of trachoma.** Rev. Oto-Neuro-Oftal. y de Cirug. Neurol., 1930, v. 5, Dec., p. 551.

The author's form of treatment utilizes sodium chloride as the agent for massaging the conjunctiva. The conjunctiva is first anesthetized with three percent cocaine solution. The fully everted upper lid is sprinkled with 100 to 200 mg. of fine salt, and this is rubbed in energetically with a flat applicator, the tip of which is covered with cotton soaked in cocaine solution. The object is to break the granulations and to produce slight hemorrhage.

The pain is not severe, but severe lacrimation lasts six or seven hours, to terminate in "a veritable euphoria". After twenty-four to forty-eight hours the subjective symptoms are greatly relieved, and the lacrimation, photophobia, and discharge decrease. The sensation of weight and burning usually disappears completely after the second application.

Following this treatment the granulations disappear, and the conjunctiva recovers its normal brilliancy within a few days. Pannus and ulcers disappear after the fifth or sixth application. The author explains the beneficial effects as due to osmotic drainage through the conjunctiva. The method has been used successfully for over two years with eighty percent clinical cures, and the remainder greatly benefited. Apparently none have been injured. Five cases are reported in detail.

A. G. Wilde.

Pascheff, C. **The chronic hyperplasias of the conjunctiva and true trachoma.** Arch. d'Opht., 1930, v. 47, Dec., p. 821.

The following classification for chronic hyperplasia of the conjunctiva is suggested:

(1) Plasmocellular hyperplasia. (2) Lymphocytic hyperplasia: (a) aleukemic lymphomatous hyperplasia (by continuity); (b) leukemic lymphocytic hyperplasia (sanguine); (c) metastatic lymphocytic hyperplasia coincident with lymphomatous tumors in the skin; (d) local lymphocytic hyperplasia. (3) Follicular hyperplasia: (a) simple follicular hyperplasia; (b) miliary follicular hyperplasia; (c) confluent follicular hyperplasia. (4) Papillary hyperplasia: (a) simple catarrhal papillary hyperplasia; (b) lymphopapillary hyperplasia; (c) fibropapillary hyperplasia. (5) Hyalinoid hyperplasia: (a) primary hyalinoid hyperplasia; (b) secondary hyalinoid hyperplasia.

Trachoma comes under the classification of confluent follicular hyperplasia, while vernal catarrh is classed under fibropapillary hyperplasia. In discussing the trachomatous form it is noted that in trachoma confluent follicles are found in the cornea and thus one cannot hope to find the causative agent of trachoma without being able

to produce these confluent follicles. Up to the present time no such organism has been found. *M. F. Weymann.*

Pelláthy, R., and Schneider, K. **Treatment of inflammations of conjunctiva and cornea, especially trachoma, with bicarbonate of soda.** Klin. M. f. Augenh., 1930, v. 85, Dec., p. 744.

The authors describe their method of examination of the conjunctival secretion with regard to hydrogen-ion concentration, which in disease showed a displacement in the direction of acid reaction, so that the effort to produce normal conditions by alkalescence of the tissue seemed justified. This was confirmed by actual results from treatment with bicarbonate of soda in powder or solution, which is recommended as adjuvant or independent therapy in diseases of the conjunctiva and cornea, especially trachoma.

C. Zimmermann.

Puscariu, Elena, and Nirzulescu, Julius. **On the pigmentation of the conjunctiva in normal individuals and in cases of keratomalacia in adults.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 18.

The authors discuss the two theories concerning the origin of conjunctival pigmentation; Kirkpatrick's and Wright's theory of disturbance of liver function, and Mori's and Pillat's theory that the pigmentation is a melanin accumulation. A gipsy aged sixty-eight years presented a xerotic lesion near the limbus which was surrounded by blackish-brown pigment. The patient belongs to a race which is naturally pigmented, which explains why his xerosis showed pigmentary change. According to Block the grains of melanin result from the reaction of an oxidase, produced in special cells, with a particular substance arising from protein, and related to tyrosin and adrenalin. In the conjunctiva, as in the skin, the production of pigment must be the same. No doubt sometimes the conjunctival coloration may be attributed to a biliary origin. (Sixteen references.) *D. F. Harbridge.*

Soudakoff, P. S. **Plasmoma of the conjunctiva in China.** China Med. Jour., 1930, v. 44, March, p. 195.

Seventeen cases of this disease were studied by the author both clinically and pathologically. All cases presented clinically a tumor-shaped growth of the conjunctiva, and histologically a diffuse plasma-cell infiltration. This infiltration of plasma cells was found either directly beneath the epithelium or separated from it by a more or less wide strip of connective tissue. There was no sharp demarcation line between the infiltrated and the uninfiltrated area, so that no definite tumor mass could be made out. At the onset, plasmoma manifests itself clinically as a small fornix growth which gradually spreads over the palpebral and bulbar conjunctiva, and may even involve the cornea. The author does not believe that this is a true tumor, but only a reaction to a chronic inflammation caused by some irritant which in most cases of his series seems to be trachoma. The mass may last from one month to ten years, but the average length of time before it undergoes hyaline degeneration is two and a half years. The treatment consists of early complete excision of the growth followed by applications of radium.

M. E. Marcove.

Towbin, B. G., and Rawic-Scerbo, W. A. **The relation of scrofulous keratoconjunctivitis to tuberculosis.** Graefe's Arch., 1930, v. 124, p. 154.

Detailed study of thirty individuals, varying in age between ten and forty-five years, having phlyctenular keratoconjunctivitis, showed that all were infected with tuberculosis and all were sensitive in a high degree to tuberculin. In twenty patients the Pirquet reaction was of an exudative character. Focal reactions occurred in the eyes in fourteen cases after subcutaneous injection of Koch's old tuberculin. In all these cases of ocular focal reaction, there was an exudative reaction in the skin when the Pirquet test was made. All these cases showing ocular focal re-

actions to the subcutaneous injection of old tuberculin had active scrofulous keratoconjunctivitis in which either phlyctenules were present at the limbus or upon the bulbar conjunctiva or more or less diffuse corneal opacities were noted. In an overwhelming majority the cases with an exudative form of reaction to the Pirquet test showed phlyctenules and corneal opacities of a diffuse character. In twenty-four cases out of twenty-six, or in ninety-two percent, the sensitiveness of the diseased eye to tuberculin corresponded exactly to the general tuberculo-anaphylactic sensitiveness to the specific virus. It appears highly probable that eyes affected with a scrofulous process are sensitized originally by living tubercle bacilli which later disappear from the eye. The relapses of the disease are dependent upon anaphylactic sensitiveness of the parts of the eye earlier affected to tuberculin which now proceeds from the pulmonary or from other tuberculous foci, even though inactive. *H. D. Lamb.*

Vengo, Luigi. **A typical syndrome of xerophthalmia from avitaminosis.** Arch. di Ottal., 1930, v. 37, Aug., p. 309. (See Section 6, Cornea and sclera.)

Verdaguer, J. **Vernal conjunctivitis and Hebra's prurigo.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, May, p. 233.

The frequent association of vernal conjunctivitis with skin diseases, noted at the Charlin (Santiago de Chile) clinic to the extent of fifty percent of the cases of the conjunctival disorder, is regarded as more than a coincidence. The most frequent accompaniment is Hebra's prurigo, and usually what is known to dermatologists as the French type of this, in which the skin lesions are localized on the face and upper extremities. In view of the eosinophilia, mild adenitis, and moderate leucocytosis common to both diseases, a common etiology is suggested, and both are regarded as manifestations of a dyscrasia of the pseudoleukemic group. *M. Davidson.*

Weiss, Charles. **Present knowledge of the etiology of trachoma.** Jour. Infectious Diseases, 1930, v. 47, Aug., pp. 107-129.

This is a monograph with a bibliography of eighty-five references. The many apparently contradictory results with B. granulosis are discussed. Weiss points out that even after the etiological agent is found there will still be great problems to solve regarding trachoma.

Ralph W. Danielson.

6. CORNEA AND SCLERA

Arruga, R. **The treatment of hypopyon keratitis with optochin iontophoresis.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, June, p. 327.

On the basis of twenty-one cases treated at Clausen's clinic at Halle, the conclusion is arrived at that iontophoresis offers distinct advantages in the application of optochin. Two milliamperes of current, best furnished by a storage battery and maintained at the same strength and applied for from two to four minutes, is the dosage, and the Wirtz corneal electrode was found most suitable. The lacrimal secretion must be constantly wiped away to prevent its coming into contact with the electrode during application. Ten cases with superficial ulceration responded to a single application of two minutes' duration, with absorption of hypopyon in twenty-four to forty-eight hours and complete epithelialization in five to eight days. The eleven cases with deep ulceration required two to four minutes and from one to three applications at intervals of forty-eight hours. Greater transparency of scars and better visual acuity were secured from the method. No resistance to optochin was found to exist in those cases which had already had instillations of optochin for as long as ten days. Attention is called to the value of iontophoresis of iodine and chlorine compounds for the clearing up of corneal opacities, and of gold compounds for tattooing purposes.

M. Davidson.

Axenfeld, T. **Dystrophies of the corneal parenchyma.** Klin. M. f. Augenh., 1930, v. 85, Oct., p. 493.

Axenfeld considers here dystrophies in which the parenchyma of the cornea without recognizable exogenous causes suffers changes of its transparency, by disturbance of its physiological nutrition or of the faculty of correctly disposing of its intake, but excluding epithelial and endothelial disorders. The conditions discussed include keratoconus, gerontoxon, adipose or xanthomatous dystrophy, and calcareous and uratic dystrophies. Axenfeld describes myxedematous or mucinous dystrophy which he observed in a boy at the age of three years, and which has progressed in the last three years. Axenfeld associates these varying types under the one point of view: a disease of the intracellular substance of the cornea which leads to swelling and impregnation with different compounds. A case of calcareous dystrophy in a boy of eight years is mentioned, in which exclusion of light by tight-fitting automobile goggles of dark Hallauer glass (also acting as a moist chamber) brought about marked recession of the deposits of calcium carbonate. *C. Zimmermann.*

Colrat, A. **Episcleral and conjunctival vasodilatation following epidemic parotitis.** Arch. d'Opht., 1930, v. 47, Dec., p. 839.

A woman aged thirty-one years suffered with a bilateral hyperemia of the conjunctiva and episclera for fifteen days following an attack of epidemic parotitis. No other pathological changes were found in the eyes. There was no secretion, but slight tenderness to pressure was manifested. The condition was considered to be a mild diffuse episcleritis with intense vasodilatation of the conjunctival and episcleral vessels. It should be classified as a complication of epidemic parotitis.

M. F. Weymann.

Friede, R. **On the possibilities of clearing corneal opacities.** Klin. M. f. Augenh., 1930, v. 85, supplement, p. 101.

After discussing the different methods extant, Friede reports five cases which he treated with abrasion and rubbing in of wintergreen oil according to Sabatzky. The excellent results described by Sabatzky were not attained in any of the cases. At best the superficial scars of the marginal zone were cleared up. From these observations Friede does not attribute to wintergreen oil a special faculty of clearing corneal scars, and only assumes that the oil elicits a nonspecific stimulation of the tissue, perhaps increased metabolism. His trials with other substances such as salt, oxycyanide of mercury, dionin, and thiosinamin were also unsuccessful. He expects better results from Kraupa's peripheral displacement of the scar by keratoplasty.

C. Zimmermann.

Friedman, Benjamin. **The rationale of the Denig transplant in trachoma, with microscopy of the graft in two cases.** Arch. of Ophth., 1930, v. 4, Dec., pp. 868-872.

Denig interposed a section of mucous membrane from the mouth between the conjunctiva and the upper corneal limbus, basing his procedure on the premise that the mucosa of the mouth was immune to invasion by trachoma. The author found, however, that this graft did not resist the invasion, nor was the vascularity of the pannus altered by the removal of the conjunctiva and substitution of the graft.

He does not feel that the improved nutrition of the cornea supposedly produced by such a graft is of value in treatment of the pannus.

M. H. Post.

Holth, S. **Revival of Galen's corneal staining with iron sulphate and tannic acid must be abandoned.** Klin. M. f. Augenh., 1930, v. 85, Dec., p. 806.

This method in vascularized leucomas must be abandoned, because the tannate of iron is expelled after three months. Nitrate and lactate of silver with hydrazin hydrate are not to be recommended, as the brownish-grey stains

are too faint. In vascularized leucomas the spot representing the pupil, tattooed with india ink, may turn blue within a few years. $PtCl_3$ (two percent with hydrazin hydrate two percent) so far seems to give a permanent black color in vascularized leucomas, whereas $AuCl_3$ (two percent) with hydrazin hydrate (two percent) may turn brown or grey within a year.

C. Zimmermann.

Key, Ben Witt. **Report of a case of transplantation of the human cornea.** Trans. Amer. Ophth. Soc., 1930, v. 28, pp. 29-41.

The procedure followed in this case was patterned after the method of total corneal transplantation proposed by Burke in 1920, and published in the transactions of this Society.

The blind man had had an enucleation of the left eye, and had a densely opaque right cornea with only light perception. The donor had a well defined sarcoma of the choroid in the equatorial region. The conjunctiva, cornea, and iris were normal: vision was 20/16.

It has been suggested that the possibility of transplanting the malignancy must be considered. On the other hand, the pathology of this complication under reasonable conditions does not seem to justify very much uncertainty.

No solutions were used during the operation. The graft remained in normal contact with the sclerotic with two corneal attachments. Deep orbital anesthesia was employed and a free external canthotomy performed. The transplant was a complete take. It has been retained in its normal position and without loss of substance for one year and seven months. A large portion of the corneal substance has remained fairly clear. The anterior chamber has been maintained from the time of the first dressing (five days after operation). The pupil has remained slightly oval in outline and without incarceration of the iris. There is no permanent hypertension. The patient has not complained of any pain in the eye or about the orbital region significant of an iritic or cyclitic reaction. The vision of the eye is only hand movements or shadows.

Given two suitable cases, this operation is well within the skill of any competent ophthalmic surgeon. In the discussion that followed it was suggested that the patient's vision might improve with time.

Edward G. Lear.

Kirby, D. B. **Keratitis exfoliativa complicating dermatitis exfoliativa (arsphenamin).** New York State Jour. Med., 1930, v. 30, June 15, p. 715. See Amer. Jour. Ophth., 1930, March, p. 263.

Lewkojewa, E. F. **A case of primary amyloid degeneration of the cornea.** Klin. M. f. Augenh., 1930, v. 85, supplement, p. 117.

A boy aged fourteen years had shown at the age of six years poor vision on account of opacity of the cornea, which gradually increased. He died from a cerebellar tumor. Histological examination of the cornea showed granulation tissue with vessels displacing the substance of the cornea, and deposit of a homogeneous substance through these vessels and independent of them in the shape of plates.

C. Zimmermann.

Malkin, Boris. **Primary degeneration of the cornea.** Zeit. f. Augenh., 1930, Dec., v. 73, p. 32.

The corneal epithelium of both eyes of an old man began to degenerate late in life, with the formation of tiny vesicles. The cornea looked grey and jellylike. Because of these characteristics the author makes a diagnosis of dystrophia epithelialis corneæ, but he adds nothing to our understanding of the nature of the disease.

F. H. Haessler.

Medviediev, H. I., and Goldfeder, A. E. **Indications for Denig's operation in trachomatous pannus.** Ukrainskii Oft. Jour., 1929, v. 1, pp. 138-145.

On the basis of their experience with twenty-one cases of trachomatous pan-

nus, and the prevailing opinions of ophthalmologists, the writers conclude that Denig's or Gallemaerts' operation can be used not only in far advanced and neglected cases of pannus with deep and irremediable corneal changes, but also in cases refractory to conservative treatment, and especially in those patients suffering from the cicatricial type of trachoma, and who are deprived of regular expert ocular attention. Following the above indications, the authors were able, in many cases, not only to destroy pannus, but also to prevent deep corneal involvement leading to visual disturbances and blindness.

J. I. Gouterman.

Peters, A. **Clinical remarks on relapsing erosions and herpes corneæ.** Klin. M. f. Augenh., 1930, v. 85, Nov., p. 640.

In a publication twenty-five years ago Peters showed in a series of apparently very different affections of the cornea the occurrence of common phenomena, such as the easy detachability of the epithelium and a certain edema of the cornea, and attributed them to neurogenous influences. The type of this disease was the so-called relapsing erosion. The same changes were found in two herpes variations, in dendritic and disciform keratitis (which may be of traumatic origin), and in serpent ulcer. He does not claim the lesion of the nerves as the cause of the infectious inflammation, but only as the basis of spreading, since tissue damaged through trauma, just as in relapsing erosions, furnishes very favorable conditions for propagation of the infection. Recent contributions by Salus, Franceschetti, and others corroborate the neurogenous theory.

C. Zimmermann.

Towbin, B. G., and Rawic-Scerbo, W. A. **The relation of scrofulous keratoconjunctivitis to tuberculosis.** Graefe's Arch., 1930, v. 124, p. 154. (See Section 5, Conjunctiva.)

Vengo, Luigi. **A typical syndrome of xerophthalmia from avitaminosis.** Arch. di Ottal., 1930, v. 37, Aug., p. 309.

The author gives a historical review of previous theories as to the etiology of keratomalacia in children and xerophthalmia in adults. He finally concludes, as is well known already, that both conditions are due to avitaminosis; in this case a deficiency of fat-soluble vitamin A. The hesperanopsia, he believes, is due to deficiency in regeneration of the visual purple, caused in turn by a deficiency of vitamin A in the lipoid substances contained in the pigmented epithelium of the retina.

David Alperin.

Von der Heydt, Robert. **Slit-lamp observations of keratoconus.** Trans. Amer. Ophth. Soc., 1930, v. 28, pp. 352-361.

The following may be observed in the cornea with magnification and focal illumination: the endothelial cup—a typical central reflex; Fleisher's keratoconus ring, at times incomplete and often pigmented, if old; an increased visibility of the corneal nerve fibers (comparatively rare); Vogt keratoconus stripes (common); rupture of Descemet's membrane (fairly frequent in advanced cases). *Edward G. Lear.*

Wright, C. S., and Perlman, H. H. **Treatment of interstitial keratitis with special reference to the use of bismuth.** Jour. Syph., 1930, April, p. 169.

The authors are very enthusiastic in their statements as to the value of bismuth, either alone or with intravenous neoarsphenamin, in the treatment of congenital luetic interstitial keratitis. They report four cases and cite six more in which treatment with bismuth had a marked influence. They claim that if bismuth is used early there is less danger of bilateral involvement. Their usual dose is of one hundred mg. of potassium bismuth tartrate weekly, by intramuscular injection.

M. E. Marcove.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Adler, F. H. **An investigation of the sugar content of the ocular fluids, under**

normal and abnormal conditions, and the glycolytic activity of the tissues of the eye. Trans. Amer. Ophth. Soc., 1930, v. 28, pp. 307-340.

The determination of sugar present in the aqueous humor of cats showed an average of 113 mg. per 100 gm. The average concentration of sugar in the whole blood drawn simultaneously was 135 mg. per 100 gm. The lower concentration of sugar in the aqueous as compared with the blood suggests that in the formation of the aqueous some of the sugar fails to get into the anterior chamber. The concentration of sugar in the vitreous is very much lower than that of either the aqueous or the whole blood. The low concentration of sugar in the vitreous is probably due to the marked glycolytic power of the retina.

The aqueous promptly followed the rise and fall of blood sugar, when altered by intravenous injection of glucose. On the other hand, the vitreous showed a definite lag in equilibrating its sugar level with rises and falls of blood sugar. The glycolytic power of the retina is double that of any other eye tissue. *Edward G. Lear.*

Gilbert, W. **Thoughts and observations on the etiology of uveitis, especially of unknown origin.** Klin. M. f. Augenh., 1930, v. 85, supplement, p. 65.

Today the etiology of uveitis is known in from seventy to eighty-five percent of the cases, with predominance of tuberculosis. Gilbert calls attention to a group of cases of bilateral uveitis occurring at middle age, in connection with affections of the optic nerve and vitiligo, as described thirty years ago by himself, then by Erdmann and Komoto. Recently Koyanagi published a series of cases of severe uveitis combined with dysacusis, alopecia, and poliosis. These, in some cases complicated by disturbed sexual function, suggest an insufficiency of the endocrine glands. *C. Zimmermann.*

Jahnke, Walter. **Protracted recurrent iritis secondary to tonsillar infection.** Zeit. f. Augenh., 1930, v. 72, Nov., p. 354.

In a patient in whom chronic iritis had recurred a number of times despite apparent temporary response to antirheumatic therapy, squeezing of the tonsils repeatedly caused an exacerbation of the iritis. After tonsillectomy there was another recurrence, followed by complete healing.

F. H. Haessler.

Kaitz, H. **A case of uveoparotid fever.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 36.

A female aged twenty-four years had a bilateral parotitis and uveitis with a temperature range of 99.8 to 101 degrees. Wassermann and tuberculosis tests were negative. Both corneas presented mutton-fat deposits. An active iridocyclitis was present with extensive posterior synechiæ. There was no discoverable tuberculous lesion or facial nerve palsy. *D. F. Harbridge.*

Leoz Ortin, G. **Pathology of the anterior chamber.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, July, p. 373.

The conception of the anterior chamber as a serous cavity is based on anatomic and physiologic analogies. Viewed anatomically it possesses a lining membrane of endothelium on a connective tissue base and contains an albuminous liquid, and one of its functions is obviously that of lubrication and elimination of friction between two articulating surfaces—the mobile iris on one hand and the anterior lens surface in its accommodative play on the other. Just as we recognize primary affections of all the other serous cavities, which because of their poor vascularization are very susceptible to metabolic and endocrine as well as exogenous toxins, we must consider the possibility of a primary descemetitis as a manifestation of arthritism. Since the advent of the slit-lamp it is not uncommon to find edema, haziness, and desquamation of Descemet's membrane, deposits of fibrin, leucocytes, and pigment, and even synechiæ and flocculation of the aqueous without any demonstrable involvement of the iris, cornea, or ciliary body. The symptoms

of primary descemetitis are a sensation of heaviness and photophobia, accompanied by mild ciliary injection. It has a tendency to recurrence and occasionally leads to a secondary iritis.

M. Davidson.

Procksch, Marie. **Treatment of retinal and choroidal affections with amyl nitrite according to Imre.** Klin. M. f. Augenh., 1930, v. 85, Dec., p. 795. (See Section 10, Retina and vitreous.)

Sander, P. **Sympathetic ophthalmitis developed forty years after an operation on the fellow eye.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 25.

A female aged forty-eight years complained of decreased vision in her left eye. At the age of eight years her right eye was operated on and for several years this eye was painful, while the left was a source of long standing trouble. The present examination revealed a shrunken tender right globe; the left had trachoma, leucomatous cornea, ciliary injection, corneal precipitates, and narrow pupil. The enucleated shrunken globe contained bone. Left vision fell from 6/18 to 1/20. Persistent use of atropin finally caused the pupil to dilate, and this together with active treatment was followed by steady improvement. After three months the eye was quiet, and with —1.00 sph.. vision was 6/12. *D. F. Harbridge.*

Thies, Oscar. **Iritis and menstruation.** Graefe's Arch., 1930, v. 124, p. 103.

From the findings in three cases, the author thinks it is very probable if not absolutely certain that a direct connection exists between iritis and menstruation; such an influence rests upon an endocrine basis in a dysfunction of the ovaries. *H. D. Lamb.*

8. GLAUCOMA AND OCULAR TENSION

Axenfeld, T. **Indications for the various glaucoma operations.** Klin. M. f. Augenh., 1930, v. 85, Oct., p. 478.

First the medicinal therapy of glaucoma is considered. Conservatism must never be carried so far as to cause the patient to fear operation. Iridectomy still occupies the first place in acute glaucoma. The different operations for glaucoma simplex and hydrophthalmos, trephining, cyclodialysis, and sclerotomy, and their indications, are discussed in detail.

C. Zimmermann.

Blaickner, J. **Iridencleisis operations.** Zeit. f. Augenh., 1930, v. 72, Oct., p. 265.

Among 56 iridencleisis operations done at the Graz Clinic, the author was able to view 42 eyes after a sufficient length of time to justify concluding that the end result was permanent. The vision was made worse in 19 percent, there was a field loss in 16 percent, the tension was brought to normal in 90 percent, and remained slightly elevated in 10 percent. It is essential to produce a canal lined with pigment epithelium. The inclusion of iris stroma is not the effective measure. It is a mistake to give miotics after the operation because they tend to pull on the iris and also cause hyperemia. The author does not even give miotics before the operation. Their effect on chronic simple glaucoma at best is minimal. *F. H. Haessler.*

Brookes, George. **Elliot's trephine operation—a variant.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 34.

The author suggests the following variance from the usual trephining procedure. After less than the usual cocainizing by drops, the conjunctiva is seized as high up as possible and lifted well off the eyeball. Three-quarters of a cubic centimeter of a sterile solution of novocaine and adrenalin is then injected into the loose areolar tissue, the needle entering half-way up the side of the tent. After releasing the forceps and withdrawing the hypodermic needle, the bleb is massaged gently but firmly downward over the limbus.

One does not wait, for this allows infiltration and consequent brittleness of the flap, but opens immediately into the superior side of the bleb with one large

cut of very blunt-pointed scissors. These are then inserted closed into the wet pocket and opened laterally; a couple of side cuts allow the flap to be turned down over the cornea. After the field is mopped dry, it is surprising how little splitting of the cornea remains to be done with a metal instrument. He considers a permanent and successful bleb more likely to occur in the natural plane of cleavage which the injection produces. *D. F. Harbridge.*

Cirincione, G. **Conclusion of article on glaucoma** from unpublished (posthumous) treatise. Ann. di Ottal., 1930, v. 58, Nov., p. 923.

Contrary to accepted tradition the author finds that the incidence of glaucoma is no greater among Hebrews than among other races. *Park Lewis.*

Derer, Josef. **Familial juvenile glaucoma.** Oft. Sbornik, 1930, v. 5, pp. 112-114.

Familial juvenile glaucoma was inherited by all four sons of a father who had been blinded by glaucoma when he was thirty-four years of age. Three daughters are not affected. Three sons became blind without being treated at the ages of 22, 19, and 16 years. The fourth son was operated on two years ago (cyclodialysis), when the tension fell to 6 or 7 mm. Hg. Although this hypertony has been permanent, the function of each eye has gradually diminished. Vision before operation was R. 6/6?, L. 6/12. To-day R. 6/24?, L. 6/36. The field of vision is also slowly contracting. The deep excavation has disappeared. After the operation a transitory myopia of 7 D. was observed, which disappeared after 3 or 4 weeks. All cases had very deep anterior chamber, atrophic iris with fixed semidilated pupil, and (where visible) excavation of the optic nerve.

G. D. Theobald.

Duke-Elder, W. S. **The drainage of the intraocular fluids.** Brit. Jour. Ophth., 1930, v. 14, Dec., p. 620.

This contribution is really a refutation of Ridley's recent thesis in which he attempts to reestablish an old hypothesis that the greater part of the drainage of the aqueous humor occurs through the cornea into the conjunctival sac and not through the canal of Schlemm. Duke-Elder puts forward one experiment which he believes is conclusive against Ridley's experiments. By means of a needle inserted into the anterior chamber a solution of methylene blue is allowed to flow in; in one and a half minutes the episcleral veins are deeply dyed; there is no evidence of any coloration of the cornea nor the minutest evidence of dye in the conjunctival sac. *D. F. Harbridge.*

Franta, J. **Blood serum content of calcium and potassium in primary glaucoma.** Oft. Sbornik, 1930, v. 5, pp. 75-88.

At the Czech eye clinic in Prague, quantitative tests were made to determine calcium and potassium content in the blood of sixteen cases of primary glaucoma and in sixteen controls. De Waard's method was used to determine calcium and that of Krämer-Tisdall for potassium. The blood was obtained from all patients at the same period (11 to 12 a.m.) and one c.c. of blood serum was used for each test. Each test was repeated twice, and on consecutive days. The content of calcium in primary glaucoma, compared with controls, is slightly raised (0.3 mg. per c.c.). This increase is so slight that it may represent a mistake in observation. Calcium in all cases was between ten and twelve mg. per c.c. The potassium content was 20.57 mg. per c.c. in glaucoma and 22.75 mg. per c.c. in the controls, making the potassium content 2.18 mg. per c.c. lower in the glaucoma cases. (Tables, Bibliography.)

G. D. Theobald.

Gala, A. **Myopia and glaucoma.** Oft. Sbornik, 1930, v. 5, pp. 119-125.

The author found 8 cases of myopia in 437 cases of primary glaucoma; 7 were males. One was 44 years of age, the others over 50. The second part of his paper deals with myopia following operations for glaucoma, especially

following cyclodialysis, trephining, also after iridectomy. It is four times as frequent as in nonoperated cases, and originates from the loosening of the suspensory ligament of the lens. (Tables, Bibliography.)

G. D. Theobald.

Holth, S. **Iridencleisis with meridional iridotomy.** Arch. of Ophth., 1930, v. 4, Dec., pp. 803-816.

In this paper, the author describes an operative method for use in both acute and chronic primary glaucoma. Among 640 operations occurring in his private practice over a period of twenty-five years, 223 were iridencleisis, 268 punch forceps sclerectomies, and 140 trephinings of the Elliot type. Iridectomies are not included in this number. Permanent tonometrically normal tension without miotics has been obtained and observed unchanged for years after iridencleisis and punch forceps sclerectomies.

The author has abandoned his first punch forceps operation, Elliot's trephining, and the tangential punch forceps sclerectomy. In all three methods there was tremendous initial fall of tension, but, as a rule, after a few years the wound became filled with scar tissue and the tension returned. In the iridencleisis operation, however, in only 50 percent of the cases does the tension at once become normal. In 35 percent miotics must be used for a fortnight to one-half year following operation, but in only about 15 percent is continuous use necessary. The author has never observed a late infection in a seeing eye. It occurred once, however, in a case of absolute painful glaucoma, about two years after operation, and once a superficial type was noted nine years after operation, but disappeared in two days. He attributes this absence of late infection in iridencleisis to the fact that the subconjunctival end of the iris fistula is some distance from the corneal limbus. In no case has early onset of cataract been observed. The author objects to cyclodialysis, because of the likelihood of cataract forming as a result of atrophy of the ciliary body, and he finds iridotasis unsatisfactory because of the resulting eccentricity of the pupil.

In 1904, the author first performed iridencleisis with good results, and in 1906 he demonstrated microscopically the filtering fistula obtained by this method.

In the author's procedure, the iris is pulled out through the incision, released by the forceps and a section made with scissors through the sphincter. This prevents drawing up of the pupil through action of the sphincter when the mydriatic is removed. The corneal section is made with a stopped keratome. A double conjunctival hook is also recommended. Of course, blunt-pointed scissors must be used for section of the iris. *M. H. Post.*

Hrankovic, L. **Primary juvenile glaucoma.** Oft. Sbornik, 1930, v. 5, pp. 115-118.

During a period of ten years the author studied fourteen cases of juvenile glaucoma (23 to 38 years). He classifies their etiology as follows: 3 hypofunction of the ovaries; 1 calcification of the pineal gland; 2 during pregnancy, one of which had eclampsia; 3 syphilis, one of which also had disturbance of internal secretion; 2 heredity; 1 hypertony (disturbance of hypophysis and suprarenal capsule). In 2 the etiology was not clear.

G. D. Theobald.

Kurz, Jaromir. **Value of Elliot's trephining in glaucoma.** Oft. Sbornik, 1930, v. 5, pp. 99-104.

During a period of ten years, Elliot's trephining was performed on 98 eyes in 71 patients. Patients included in this report have been under observation for at least a year following the operation. Results are estimated by intraocular tension, condition of field of vision, and acuteness of vision. Fistulas could be demonstrated in 75 percent of the cases, but only in 63.2 percent are the results classed as good. In 25.5 percent the results were bad. In five cases the trephining was repeated. Complica-

tions rarely occurred after operation and were unimportant. In two cases late infection resulted in loss of the eye. The author considers the operation one of choice, especially in clinic patients suffering with chronic glaucoma, even though tension is reduced by conservative treatment. These patients do not return for observation, and bad results are mostly due to the fact that patients are operated upon too late. *G. D. Theobald.*

Marx, E. **Simultaneous registration of the pressure in the eye and in the cephalo-rachidian liquid.** Ann. d'Ocul., 1930, v. 167, Dec., pp. 1001-1017.

Experiments were done on rabbits and cats. Injection of an isotonic solution of sodium chloride in the vein caused either no increased pressure or only a very slight increase in the two systems. Hypertonic sodium chloride solution slightly reduced the pressure in each system. Hypotonic solution raised it. Changes took place always simultaneously in each system, though not always in the same degree. It is probable also that intraocular pressure varies with the pressure in the cerebral sinuses. *Lawrence T. Post.*

Mrazova, Irena. **Efficacy of Elliot's trephining and cyclodialysis in primary glaucoma.** Oft. Sbornik, 1930, v. 5, pp. 89-94.

At the Brno eye clinic, during a ten-year period, 236 eyes in 195 patients were operated upon either by the Dupuy-Dutemps modification of Elliot's trephining or by cyclodialysis. Chronic glaucoma simplex showed improvement in all cases. Inflammatory glaucoma showed improvement in eighty-four percent of the cases, with improved vision in two cases. The percentage of cases reoperated was 2.3. The author finds these two methods equally valuable, from the standpoint both of results and of complications. In cases where a second or third operation may be necessary, better results are obtained where Elliot's trephining is followed by cyclodialysis than where cyclodialysis is followed by trephining. (Tables. Bibliography.) *G. D. Theobald.*

Wiechmann, Ernst. **Clinical investigations of the relations between osmosis, blood pressure, and intraocular tension.** Klin. M. f. Augenh., 1930, v. 85, Dec., p. 815.

Wiechmann found decrease of intraocular tension characteristic of hypoglycemia. Systematic examination of blood pressure and ocular tension in hypoglycemic conditions of fifteen persons, partly diabetic, showed no parallelism between blood pressure and ocular tension, the latter remaining normal in increase or decrease of blood pressure. *C. Zimmermann.*

9. CRYSTALLINE LENS

Manes, A. J. **Experiences in 280 intracapsular extractions.** Arch. de Oft. de Buenos Aires, 1930, v. 5, Sept., p. 382.

Intracapsular extraction is regarded as the ideal method, on account of eliminating secondary cataract and postoperative iritis due to absorption of lens substance, and because of the better visual acuity obtained. Furthermore it is not necessary to await maturation, as the incipient stages are readily operated upon.

Postoperative choroidal separation is of no consequence, as after three or four days the anterior chamber is reformed and the eye goes on to complete healing. This is produced by an invasion of the suprachoroidal space by serum or blood, which causes the anterior chamber to be encroached upon. Cases in which this occurred seemed to make even better recovery than where it did not, so that the author has attempted to bring this about by gentle pressure on the inferior segment with a strabismus hook.

In the last fifty cases, peripheral iridectomy was omitted, as it seemed to have little beneficial effect, and furthermore tended to deform the pupil. Omitting this also avoids the trouble-

some hemorrhage that sometimes follows section of the iris.

A. G. Wilde.

Marquez, M. **Lens antigen therapy in cataract.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, May, p. 253.

In a paper read before the Royal National Academy of Medicine of Spain, it is pointed out that slight improvements in vision and remissions in progress in cataract are valueless in appraising the effect of medical treatment, that oral administrations of antigens and local application of baths, drops, electricity, and so on, are unscientific, and that endocrine and immunologic studies alone will lead us to the conquest of cataract. In the meantime the mechanism of production of lens opacities should be cleared up. The most important factor in its production is an increased permeability of the capsule. While lens albumen is organ-specific and when injected produces phacolysins, as shown by studies made by Marquez's pupils, there is an important difference between the antigens of transparent lenses and those of cataractous lenses. The rapid absorption of persistent secondary cataract in one eye, a few days after extraction performed on the fellow eye, has been repeatedly observed by the author and others. Studies are being made on the value of cataractous lens antigen to promote the removal, not the absorption, of opacities, in specially suitable cases, such as those of persistently unabsorbed secondaries and slowly absorbed opacity following discission and trauma. The suggestion is made that the antigen may eventually be of value in reducing operative trauma in the adult to a minimum, and resorting to antigen to cause the absorption of remaining lens matter. *M. Davidson.*

10. RETINA AND VITREOUS

Gil, R. R., and Beranger, R. P. **Amaurotic family idiocy.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, April, p. 180.

This is the second case of Warren-Tay-Sachs disease to be reported from the Argentine in an infant without any trace of Jewish blood in the ancestry. There was a positive blood Wassermann in the mother. *M. Davidson.*

Samuels, Bernard. **Opacities of the vitreous.** Arch. of Ophth., 1930, v. 4, Dec., pp. 838-857.

The present paper is an attempt to correlate the opacities of the vitreous seen in life with the histopathology of the vitreous body. Many fine, floating opacities seen with the ophthalmoscope cannot be made out on pathological section, due to the fixative used. The contrary also holds good, certain cells being visible under the microscope, while the fibers or lamellæ to which they cling are not seen. The muscæ volitantes of youth are probably cells adhering to fine threads which cannot be made out.

Opacities are classified: (1) Physiological, including embryonal, resulting from the remains of Cloquet's canal or the hyaloid artery; and senescent, due to a thread or tangle of threads detached from the wall of a cavity in the vitreous. (2) Pathological opacities, divided into: (a) Cells from exudate, such as lymphocytes and leukocytes, which opacities may result in general cloudiness, or in small, round, woolly areas, lying just within the posterior limiting membrane of the vitreous. When in the vitreous, such cells are disposed according to the structure of the stroma. They may, however, lie in many other places than within the vitreous itself. (b) Red blood cells. Such cells may lie within or without the vitreous, occasionally just behind the lens, where the cells may remain unchanged for a long period of time. (c) Pigmented epithelial cells. These cells may be intact or broken up. If broken up, the granules may be found free in the vitreous, often with blood pigment scattered among them. (d) Blood vessels. Blood vessels may arise in the vitreous covered only by their muscular coat. (e) Connective tissue. Connective tissue membranes may spread over the retina and may be detached by transudation, other membranes form-

ing in their place, in turn detaching again. Flat, whitish areas in the fundus may result from the presence of such membranes. (f) Strands. Strands may arise from such a focus and whip about in the vitreous. (g) Glial spheres. These globular masses may be free in the vitreous, or may be attached to the retina by a slender pedicle. (h) Tissue spheres with pigment. Such spheres may lie entirely free in the vitreous chamber, appearing to be the remnants of broken down coagulated stroma. (i) Tissue spheres without pigment. Spheres of this nature are also present, seemingly derived from the pigment epithelium of the retina.

Hyaloid detachments are discussed, especially in relation to retinal detachment. *M. H. Post.*

NEWS ITEMS

News Items in this issue were received from Drs. C. A. Clapp, of Baltimore, and M. Paul Motto of Cleveland. News items should reach **Dr. Melville Black** by the ninth of the month.

Death

Dr. Sampson Busby Allen, Charlottesville, Virginia, aged seventy-seven years, died February fourth of cerebral arteriosclerosis.

Dr. Ernest C. Wheeler of Tacoma, Washington, died January twenty-first, after a brief illness, aged fifty-nine years.

Miscellaneous

The new research institute and hospital in Saint Louis for eye, ear, nose, and throat was opened in January. This institution, as previously reported, was made possible through the bequest of $1,200,000 from the late Mrs. William McMillan, Saint Louis, and by gift of $650,000 from Mrs. Oscar Johnson, her sons, and two friends in memory of Mr. Johnson. The six upper floors will house the Oscar Johnson Institute for research in and for the teaching of ophthalmology and otolaryngology. Full time departments in these subjects are financed by a grant from the General Educational Board of the Rockefeller Foundation. One floor is devoted to research in physics and physiology as applied to ophthalmology and otolaryngology. Three other floors planned for research in chemistry and bacteriology will be immediately put to use by a grant of $50,000 a year for five years by the Commonwealth Fund for a comprehensive investigation of trachoma. A roof garden furnishes recreation facilities for the staff and a sun parlor for patients. Dr. Harvey J. Howard will direct research in ophthalmology.

We have received from Professor F. Terrien of Paris, unfortunately too late for inclusion in our March issue, notice of a postgraduate course in ophthalmology to be given at the Clinique Ophthalmologique de l'Hôtel-Dieu by Professor Terrien with the assistance of Professors Rathery, Regaud, Strohl, and Tiffeneau; Associate Professors Velter and Zimmern; and Drs. Casteran, Veil, Renard, Blum, Dollfus, Hudelo, Braun, and Goulfier, from April 17 to May 15, 1931. The subjects covered will include diagnosis, therapeutics, relation to general diseases, biomicroscopy, bacteriology, serotherapy and related topics, physiologic optics, refraction, miscellaneous topics, and various branches of ocular surgery. The charge for the course is three hundred francs, and registration is with the secretary of the Faculty of Medicine of Paris.

On account of increasing expense, the Archivos de Oftalmologia Hispano-Americanos has found it necessary to increase the subscription price by five pesetas a year (an increase of about one dollar).

Dr. William H. Wilder, secretary of the American Board for Ophthalmic Examinations, announces that a special examination by the Board will be held in Denver on Thursday, July 23, 1931. It is essential that any candidates who contemplate taking the Board's examination at that time shall forward their applications, or any supplemental details which may have been requested by the Board, to Dr. Wilder at the earliest possible date. (Address 127 South Michigan boulevard, Chicago.)

The Hungarian Ministry of Public Welfare and Labor offers a prize of 2,000 Swiss francs (about four hundred dollars) for independent work showing valuable progress on the etiology of trachoma. Essays are to be addressed to Eye Clinic No. 1, Peter Pazmany University, Budapest (VIII, Mariautca 39) not later than June 30, 1931. Works already in print are eligible, as well as essays written for the competition, and the jury of award may also consider essays not submitted for competition but appearing in print between July 1, 1929, and June 30, 1931. Essays may be written in German, English,

French, Italian, or Hungarian. The jury's decision will be announced not later than December 31, 1931. The following jury of award has been appointed: A. F. MacCallan, London; Victor Morax, Paris; L. Maggiore, Bari (Italy); Carl Prausnitz, Breslau.

Societies

At the January meeting of the Kansas City Society of Ophthalmology and Otolaryngology the guest of honor was Dr. Alexander E. McDonald of Toronto, Canada, who held a diagnostic clinic of fundus cases at the General Hospital. In the afternoon Dr. McDonald gave a clinical lecture on a new theory on the cause of methyl-alcohol amblyopia, and in the evening he presented a paper on hemorrhage about the optic nerve as a complication of intracranial hemorrhage.

It has been decided to postpone the first all-Ukrainian trachoma congress to the summer of 1932, and the congress will be held in Kiev after the second allied ophthalmologic conference (Russian), the delegates to which will take part in the later meeting. The program of the trachoma congress will be as previously arranged.

Personals

Dr. Alan C. Woods has been elected chairman and Dr. Henry F. Graff secretary of the ophthalmological section of the Baltimore City Medical Society.

Dr. M. Paul Motto has been promoted to the rank of Lieutenant-Colonel in the Medical Reserve Corps.

Dr. W. E. Bruner, professor of ophthalmology at the Western Reserve Medical School of Cleveland, has been away for a six weeks vacation at Sarasota, Florida.

At the February meeting of the Cleveland Ophthalmological Club, Dr. E. M. Alger, professor of ophthalmology at the New York Postgraduate Medical School and Hospital, presented a paper on the simulation of blindness.

Lieutenant-Colonel E. L'G. Kirwan, I.M.S., has been appointed professor of ophthalmology at the Medical College of Calcutta, India, succeeding Lieutenant-Colonel W. V. Coppinger, I.M.S.